

CONCEPTS OF *ASTHI SHARIR* (OSTEOLOGY) IN *AYURVEDA*Soni Gaurav^{*1}, Manohar. J² and Lahange Sandeep³

¹PG Scholar, ²Assistant Professor, ³Lecturer, PG Department of *Sharir Rachana*, National Institute of Ayurveda, Jaipur, Rajasthan, India.

Article Received on
18 June 2015,

Revised on 09 July 2015,
Accepted on 30 July 2015

Correspondence for*Author****Soni Gaurav**

PG Scholar, PG

Department of Sharir

Rachana, National

Institute of Ayurveda,

Jaipur, Rajasthan, India.

ABSTRACT

Ancient seers of Ayurveda have classified the elements of the body under three fundamental components- *Dosha*, *Dhatu* and *Mala*. Among these basic elements *Dhatus* are especially meant for *Dharana* & *Poshana* of *Sharira*. When all the above factors act in harmony, it is defined as *Swastha* (health). *Asthi* is the hard part which forms framework of body, which supports the body just like trees stands on support of their inner wood. Knowledge of *Asthi* can be traced back from *Vedas* passing chronologically down to *Samhitas*. But the scholars preoccupied themselves with only hard parts of human skeleton. There is enough evidence of knowledge of *Asthi Sharir* (osteology) in the ancient India but in *Sutra Rupa* or in dispersed form.

Starting from Pre-Vedic period, Vedic Period and *Samhita-kalin* period all have somewhat description of *Asthi Sharir* but not in mannered way. Due to different principles, faiths and way of learning, there may be some differences or lacunas from present day knowledge. Collection and critical analysis of various concepts related to *Asthi Sharir* as per modern headings like definitions, constituents, embryology, types, uses and clinical aspects. Thus an effort is undertaken to understand *Asthi Sharir* and its concepts in scientific way. Though there may be some differences or lacuna's from now a day knowledge but, we can have proud on our glorified past of knowledge in every medicinal field especially in *Asthi Sharir* knowledge.

KEYWORDS- *Asthi Sharir*, *Asthi Dhatu*, *Asthi Prakara*, Osteology.

INTRODUCTION

Asthi is a hard substance which remains even after most part of body has been decayed. According to *Susruta*, *Asthi* is substance which remains even after else very part like flesh,

muscles etc. are shattered even after burying the body after death.^[1] It remains as last identity of person even after demise. According to *Shabdastomkara*, it is part of body which remains till long period even after death of body.^[2] “*Hada*” is synonym of *Asthi*.^[3] *Amarkoshakara* has given following synonyms of *Asthi*–“*Keekas*”, “*Kulyamn*”, meaning hard substance providing support to body. According to “*Halayush kosa*”, it is substance of body which remains till last and is in whole body.

Asthi Dhatu- *Dhatu*s are the tissue-humoral systems of the body. They are always formed in a fixed sequence. In different permutations and combinations the *Dhatu*s form various physical organs of the body according to the genetically coded information's. It is one among the *Sapta Dhatu*s which are present in the *Sharira*. Form of *Dhatu* which is present inside the *Mamsa Dhatu* is known as *Asthi*.^[4]

Panchabhautika Constitution- Though every substance is made of all five *Mahabhutas* (*Akasha*, *Vayu*, *Agni*, *Jala* and *Prithivi*), but *Asthi* has predominance of *Prithivi* and *Vayu Mahabhuta*.^[5] As we have seen that *Asthi* has predominance of *Prithvi* and *Vayu Mahabhuta*, *Asthi Dhatu* thus comprises qualities of these two dominantly. As per qualities of *Prithvi Mahabhuta*, *Asthi* is strong and heavy and as per qualities of *Vayu Mahabhuta*, *Asthi* is dry and rough. Thus, both these *Mahabhuta* give characteristic qualities like toughness, roughness, dryness and hardness.^[6]

Asthi Utpatti and Poshana- As is told by *Acharya Charak* in *Chikitsa Sthana* ^[7], after *Rasa Rakta* is formed. From *Rakta Mamsa* is formed, from *Mansa Meda* is formed, from *Meda Asthi* is formed, from *Asthi Majja* is formed and from *Majja Shukra Dhatu* is formed, which when gets adequate conditions develops into *Garbha*.

Chakrapani details it as follows- For first three *Dhatu* –*Rasa* after being digested by *Rasagni* gets converted into *Rakta* and like this *Rakta* digested with its *Raktaagni* gets converted into *Mansa*. Like this all *Dhatu* gets converted into next coming *Dhatu*. Like as *Dugdha* to *Dahi*, *Dahi* to *Navneeta*, *Navneeta* to *Grihta* and from *Grihta* to *Grhtamanda* get converted step wise, same is concept for *Dhatu* formation.

But many doubts^[8] arises here in this explanation of *Dhatu* development like.... when both *Mansa* and *Meda Dhatu* are *Slakhana* than how is *Asthi Dhatu* is *kharatav* (solid)? If *Asthi Dhatu* is *kharatav* than how does *Majja Dhatu* which resides in *Asthi* are *Snighda* and

Mrudu? These doubts popped up by disciples where satisfied by *Archarya* as he explains,^[13] it as every next coming *Dhatu* in series gets its nutrition from *Dhatwagni* of particular *Dhatu* and supply from earlier *Dhatu*. *Ghanatava*, *kharatava* are due to *Vayu*, *Snighatava* due to *Jala* etc.

According to *Kasyapa*- *Asthi* and *Mansa* of embryo are developed from this *Sukra* and from these two *Snayu* are developed in first two months of fetal development^[9].

Though development of *Asthivaha Srotas* has not been described separately, yet *Susruta* describes it in description of *Medodhara Kala*^[10]. Here *Susrutha* tells that *Medodhara Kala* is present in *Udar* (abdomen), *Anuasthi* (short bones) and *Majja* in *Mahat Asthi* (long bones).

Time taken in formation of *Asthi Dhatu*- There are two opinions regarding formation of *Asthi* depending upon the time factor. Like on the 6th day and 20th day.^[11, 12]

Relation between *Vata Dosha* and *Asthi Dhatu*- According to the classics, *Asthi* is the seat of *Vata* and *Asthi* acts as *Ashraya* and *Vata* acts as *Ashrayee*. Even though the basic rule is that the materials which cause increase of *Ashraya* should also affect the increase of *Ashrayee* and materials that cause decrease of *Ashraya* cause decrease of *Ashrayee*. The reverse is true in the case of *Vata* and *Asthi*. A material which causes increases of *Asthi* will produce decrease of *Vata* and vice versa.

Contribution of *Asthi* for body- As the toy is made up of straws and threads and pasted with the wet clay from outside, similarly *Snayu* (ligaments) are tied with *Asthi* (bones) in body. Ligaments are covered by *Mansa* (muscles) which are nourished continuously by the *Dhamani* and *Sira* (vessels) and then whole body is covered by *Twacha* (skin). This indicates that *Asthi* is meant for playing anchor role of frame work of body and is supported effectively by *Snayu*, *Mansa*, *Dhamni* and *Sira*.^[13]

Asthidhara Kala- *Purisha dhara kala* is the 5th *Kala* which exits in large intestine i.e. *Pakvashaya*. Functionally it separates constituents of *Kitta* or waste products in colon. *Vayu* which is produced in *Pakvashaya* (as *Anna Mala*) is *Poshaka Vayu*, which nourishes *Poshya Vayu* of body. As we know that *Pakvashaya* and *Asthi*, both are main seats of *Vata Dosha*. Therefore, increased or decreased formation of *Vata* and *Purisha* affects all sites of *Vata*, especially *Asthi Dhatu*. Hence *Purisha-Dhara Kala* is also called as *Asthi-Dhara Kala*.^[14]

Asthi Karmas-The *Asthi Karmas* are as follows-*Deha Dharana*, *Majja Pushti* and *Asthi* supports the *Mamsa*, *Sira* and *Snayu*.^[15,16]

Asthi Upadhatu^[17] - The *Upadhatu* of *Asthi* is *Danta* (teeth's.)

Asthi Malas- During the formation of any *Dhatu* it will produce their own *Malas*. Similarly *Asthi* also has *Malas*, as per different texts.

Table No.1: The *Malas* of *Asthi*^[18,19]

S.No	<i>Asthi mala</i>	Ch.S.	Su.S.	B.P.
1	<i>Kesha</i>	+	-	-
2	<i>Loma</i>	+	-	+
3	<i>Nakha</i>	-	+	+
4	<i>Roma</i>	-	+	-

Asthi Sankhya- The numbers of *Asthi* in the *Sharira* according to different *Samhitas* are as follows.

Table No.2: The Numbers of *Asthi*^{[20] [21] [22][23][24]}

S.No	Text books	Numbers
1.	<i>Charaka Samhita</i>	360
2.	<i>Sushruta Samhita</i>	300
3.	<i>Astanga Hrudaya</i>	360
4.	<i>Astanga Sangraha</i>	360
5.	<i>Bhavaprakasha</i>	300
6.	<i>Kashyapa Samhita</i>	360
7.	<i>Bhela Samhita</i>	360

The distributions of *Asthi* in the ***Shadanga*** of *Sharira* are as follows-

According to *Sushruta Samhita*^[25]

- *Shaakha* : 140
- *Shroni*, *Parshva*, *Prushtha*, *Uras*: 117
- *Greevordhva* : 63

According to *Ashtanga Sangraha*^[26]

- *Shaakha* :140
- *Madhya Sharira*:120
- *Urdhva Sharira*: 100

Asthi Bhedas (Types) - Depending upon size, shape, position ^[27] of *Asthi* in the body total *Asthi* is divided into five types. These are tabulated below.

Table No.3: The Types of *Asthi* ^[28] ^[29] ^[30]

S.No	Types	S.S	A.S	A.H.	B.P
1	<i>Kapala</i>	+	+	+	+
2	<i>Ruchaka</i>	+	+	+	+
3	<i>Taruna</i>	+	+	+	+
4	<i>Valaya</i>	+	+	+	+
5	<i>Nalaka</i>	+	+	+	+

Kapalasthi ^[31] - These are flat in nature. Literally it means bone which covers and protects the brain ^[32].

Valayasthi ^[33] - These are round in shape or particularly hemi circle in shape.

Tarunasthi ^[34] - These are soft in nature. Literally it means which have either not fully developed i.e. ossified. Also the bones of child have come under same scenario. ^[35]

Nalikasthi ^[36] - These are long like tubes and hollow from within. They are reed shaped.

Ruchakasthi ^[37] - The bones which are different from all and are utilized to chew food and enjoy the taste. These are for taste sensation ^[38].

The locations of each type

1) ***Kapala-*** *Asthi*'s present in the *Janu*, *Nitamba*, *Amsa*, *Ganda*, *Talu*, *Shankha*, *Vankshana* and *Madhyashira* are known as *Kapala Asthi*. ^[39]^[40]

2) ***Valaya-*** *Asthi* in *Pani*, *Pada*, *Uru*, *Parshva* and *Prustha* are *Valayasthi*. ^[41] Some commentator's don't agree with it as they count some other bones in this category as *Pada*, *Hasta*, *Griva* and *Prishsta*.

3) ***Taruna-*** *Asthi*'s present in the *Ghrana*, *Karna*, *Greeva* and *Akshikuta* are called as *Tarunasthi* ^[42]. *Bhoja* also added *Kantha* ^[52] in list.

4) ***Nalaka-*** *Asthi*'s which are left from above description is listed in this type. ^[52] Commentators like *Dalhana* and *Bhoja* have specified some of bones like *Hasta Anguli*, *Pada Anguli*, *Pada Tala*, *Kurcha*, ^[43] *Bahu Asthi*, *Jangha Asthi* etc in examples of this type.

5) ***Ruchaka-*** The *Dashanas* are known as *Ruchakasthi*. These are 28 or 32 in all. So, here *Ruchaka* i.e. *Danta* (teeth) are also regarded as *Asthi* along with various other stiff parts.

Asthivaha Srotas- Channels of circulation or tracts within the body are called *Srotas*. They are named so because of their tendency of trickling or oozing (*Sru*: 'to flow') of secretions through them. They are the pathways (*Ayana*) for the nutrient products; waste-products and *Doshas* during the process of metabolism. *Srotas* enable their products to reach their destination (viz. assimilation of nutrient substances by different parts of the body, or elimination of waste products from the body). They transport the *Dhatus* which are undergoing transformation. *Srotas* are entity which carries onward the converted products from *Prokopa and Shamak Aahar* in human body so is the definition and function of *Asthivaha Srotas*.^[44]

Asthivaha Srotas finds its identity only in *Charaka*^[45], *Vagbhata*^{[46] [47]} but its description is missing from *Susruta's* text^[48]. As per *Charaka* its *Moolasthanas*, *Dusti karana* and *Dustilaksanas* are described. Exclusion of *Asthi Vaha Srotas* from *Susruta's* list is due to his surgeon's vision upon anatomical structures described as *Moolasthanas* that's why he described *Moola Viddha Lakshanam* in reference to injury.

Asthivaha Sroto Moola- The *Asthivaha Sroto Moolas* which are mentioned in different *Samhitas* are listed below.

Table No.4: The Sroto Moolas of Asthi^{[49] [50] [51]}

S.No	Sroto moola	Ch.S.	As.H.	As.S
1	Medo Dhatu	+	+	+
2	Jaghana	+	+	+
3	Asthi sandhi	+	-	-

Asthivaha Srotas Dusti karana^[52] - Excessive exercise, excessive stretching, trauma or excessive *Vata Dosha Pradhan Aahar* and *Vihar* can cause *Asthivaha Srotas Dusti*.

Asthivaha Srotas Dusti Lakshana^[53]- These includes *Adhyaasthi*, *Abhidanta*, *Dantabheda*, *Dantshoola*, *Asthibheda*, *Asthischoola*, *Asthi Vivaranta*, *Danta Vivaranta*, diseases of hair, nails and beard.

ASTHI MARMA- In *Adhyaya* six of *Susruta Samhita* description of *Marma* is given in very detail.^[54] Total number of *Marmas* is 107.^[55] Which are uniform in all *Samhitas*. *Sushruta* clearly indicates that a surgeon should be careful enough during operation of any patient to avoid these vital points. Total no of *Marmas* according to anatomical matrix are divided in 5 categories^[56]

- a) *Mansa Marma*- 11
- b) *Sira Marma*- 41
- c) *Snayu Marma*- 27
- d) *Asthi Marma* -8
- e) *Sandhi Marma* -20

Here we are concerned only with *Asthi Marma* ^[57] which is *Katikataruna* (2), *Nitamba* (2), *Amsaphalaka* (2) and *Sankha* (2).

Katikataruna ^[58] - This is situated in back. Kati means waist + Taruna means Cartilagenous

- Number- 2
- Type- *Pristha*, *Asthi* and *Kalantarapranahara Marma*
- Size- Half finger breadth.
- Location- *Marma* is near upper margin of pelvic bone (few centimeters from lumbosacral joints).
- Anatomy – Sacroiliac joint each side the underlying structures are –iliac bone iliac artery and sacroiliac joint and ligaments.
- On injury- Hemorrhage and death.

Nitamba ^[59] - This *Marma* refers sciatic nerve cord before entering the femoral region.

- Type- *Pristha*, *Asthi* and *Kalantarapranahara Marma*.
- Size- Half finger breadth.
- Location- Above pelvic crest, pelvis and both united flanks are together known as *Nitamba Marma*.
- Anatomy- The *Marma* lies on half the distance between sacral bone and femoral greater trochanter.
- On injury- Edema and Weakness on legs.

Amsaphalaka ^[60] - This refers to scapular blade.

- Types- *Pristha*, *Asthi* and *Vaikalyakara Marma*.
- Size- Half finger breadth.
- Location- Upper medial edge of scapular blade.
- Anatomy – This area is very important as nerve and vascular supply under it, like thoraco-cervical nerve fibers supplying the scapular muscles and reaches brachial plexus.

- On injury-Disfigurement of upper limb

Sankha ^[61] - This refers to anatomical temporal bone.

- Types- *Sira, Asthi, Sadyah Pranahara Marma*
- Site- It is in between parietal, frontal and maxillary portion of skull.
- Anatomy- Underneath this lies a temporal lobe of cortex arterial branches.
- Location- Above the end of eyebrow and between ear and forehead.
- Size- Half finger breadth.
- On injury- Death

ASTHI PRADOSHAJA VIKARAS

Dalhana mentioned the reason behind explaining the *Dhatu Pradosaja Vikara* separately, these are- *Chikitsa Vishesa Vijnanartha* and *Sukhasadhyatvadi Karma Bodhartham*.

The *Asthi Pradoshaja Vikaras* which are mentioned in different classics are *Vyadhi – Adhyasthi, Adhidanta, Dantabheda, Dantashoola, Asthibheda, Asthishoola, Vivarnata, Kesa, Loma, Nakha, Smashru Dosha, Kunakha* and *Asthi toda*.^{[62][63]} *Yogendranath Sen* in commentary of *Charaka Samhita* mentioned that *Kesha, Loma* and *Smashru* are *Malas* of the *Asthi Dhatu*. This is the reason to consider *Keshadi Doshas* as one among the *Asthi Pradoshaja Vikaras*.

EFFECT OF TRAUMA ON BONES

The bones sustain trauma in different ways. *Acharya Susruta* has paid due attention to this fact and observed that all the bones ^[64] do not show similar type of effect due to trauma.

1. *Tarunasthi* (Cartilage) – Bend
2. *Nalkasthi* (Long bones) –Break
3. *Kapalasthi* (Flat bones) – Crack
4. *Ruchkasthi* (Teeth) – Fragmented
5. *Valayasthi* (Curved bones) - Crack or Break

Classification ^[65] - On the basis of structure involved the skeletal injuries have been divided in two types- *Sandhimukta* (Joint Dislocation) and *Kandabhagna* (Bone Fracture).

The Kandabhagna further is of following twelve types- *Karkataka*, *Ashwakarana*, *Churnitam*, *Pichhitam*, *Asthichallita*, *Kanda bhagna*, *Majjanugatam*, *Atipatitam*, *Vakra*, *Chinnam*, *Patitam* and *Sputita*.^[66]

CLINICAL FEATURES

The clinical signs described in *Ayurvedic* texts stand as mentioned in any modern surgical text book. The *Susruta's* contribution in this aspect is so perfect that it has hardly any room for alteration even today. He has mentioned signs and symptoms as general and specific features.

General Features of *Kandabhagna*^[67]

Shvyathubahulyam(markedswelling),*Sparshasahisnutvam*(tenderness), *Avapidyamaneshabda* (crepitus), *Vividhavedanapradurbhavah* (Different types of pains) and *Sarvasuavasthasu Na Sharmalabha* (Inability to get comfort in any position).

BHAGNA CHIKITSA- The ancient *Ayurvedic* texts have described ' *Asthibhagna Chikitsa*' thoroughly. This includes: Principles of *Bhagna Chikitsa*, general management of *Bhagna*, specific management for different types of fractures, medicinal preparations for different kinds of fractures, *Pathya- Apathya* and clinical criteria of fracture healing.

Four Principles^[68] of Treatment

1. **Anchan-** To apply traction
2. **Pidana-** Manipulation by local pressure
3. **Sankshep-** Opposition and stabilization of fractured part of bone.
4. **Bandhan-** Immobilization.

The above mentioned classification of fractures is described by *Susruta*. This indicates his accuracy in clinical diagnosis. He has classified those varieties merely on clinical assessment, such as according to position of broken fragments, site of fracture, direction of force, and from the deformity caused by broken fragments.

CONCLUSION

Such a detailed knowledge of bones necessarily presupposes a careful study of human skeleton since the *Vedic* period. This shows that the knowledge of osteology was fairly advanced in ancient period, but the scholars preoccupied themselves with only hard parts of human skeleton, i.e. the stuff which remains after the softer tissues of the body have been disintegrated and thus not only the bones, but the cartilages and ligaments too.

Literal and fundamental work has sole aim to relate and convert the age old knowledge into more clinician friendly as per terms of this new era but to retain its principles and their basics. Thus in this article we have collected various concepts related to *Asthi Sharir* as per modern era like definitions, constituents, embryology, types, uses and clinical aspects. Though there may be some differences or lacuna's from now a day knowledge but, we can have proud on our glorified past of knowledge in every medicinal field especially in *Asthi Sharir* knowledge.

REFERENCES

1. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharira Sthana chapter 5/22
2. Shab. Kalpadrum part 1 page 155
3. Vachaspathyam, part one PP: 568
4. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sutra Sthana chapter 15/8
5. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter15/31
6. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter 15/16
7. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter 15/27
8. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter 15/28-35
9. Kasyapa: Kasyapa Samhita by KavirajaambikaduttaShastri A.M.S. with “Ayurveda-Tattva-Sandipika” Hindi Commentary Part-I Edition Reprint (2007) Published by Chaukhambha Sanskrit Sansthan-Varanas, Sharir Stana 1/1-2

10. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharira Sthana chapter 4/12
11. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter 15/21
12. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sutra Sthana chapter 14/14
13. Kasyapa: Kasyapa Samhita by KavirajaambikaduttaShastri A.M.S. with “Ayurveda-Tattva-Sandipika” Hindi Commentary Part-I Edition Reprint (2007) Published by Chaukhambha Sanskrit Sansthan-Varanasi.
14. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Kalpa Sthana chapter 4/40
15. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sutra Sthana chapter 15/4
16. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/28
17. Vagbhata: Astanga Samgraha: with commentaries of Sasileksa commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/65)
18. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Chikitsa Sthana chapter 15/19
19. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sutra Sthana chapter 46/529
20. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Sharira Sthana chapter 7/6
21. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/18

22. Vagbhata, Ashtanga Hrudaya, Sarvanga Sundari commentary of Arunadatta and Ayurveda Rasayana commentary of Hemadri, edited by Bhisayacharya Harisastris Paradkar Vaidya, 9th edition ,reprinted on 2005,Chowkhamba Sanskrit Series Office, Varanasi, Sharir Sthana chapter 3/15
23. Vagbhata: Astanga Samgraha: with commentaries of Sasileksha commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/61
24. Kasyapa: Kasyapa Samhita by KavirajaambikaduttaShastri A.M.S. with “Ayurveda-Tattva-Sandipika” Hindi Commentary Part-I Edition Reprint (2007) Published by Chaukhambha Sanskrit Sansthan-Varanas, Sharir Stana 1
25. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/18
26. Vagbhata: Astanga Samgraha: with commentaries of Sasileksha commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/61
27. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
28. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
29. Vagbhata: Astanga Samgraha: with commentaries of Sasileksha commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/65
30. Vagbhata, Ashtanga Hrudaya, Sarvanga Sundari commentary of Arunadatta and Ayurveda Rasayana commentary of Hemadri, edited by Bhisayacharya Harisastris Paradkar Vaidya, 9th edition ,reprinted on 2005,Chowkhamba Sanskrit Series Office, Varanasi, Uttar Tanta chapter 27/11
31. कं नाम शिर कपाल इति पालयति तं :| (कं याने शिर ka संरक्षण कर्णे वाली(Shabdkalpadrum; Vol (1-5) by Raja Radha Kanta Deva; chowkhamba Sanskrit Series; Varanasi.
32. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/17
33. वर्तुलाकाराणि वर्तुल अर्धवर्तुल सदृशानि | Shabdkalpadrum; Vol (1-5) by Raja Radha Kanta Deva; chowkhamba Sanskrit Series; Varanasi.

34. यानि घनता न प्राप्नुवान्ति तानि तरुणास्थिनि| Shabdkalpadrum; Vol (1-5) by Raja Radha Kanta Deva; chowkhamba Sanskrit Series; Varanasi.
35. Vagbhata: Astanga Samgraha: with commentaries of Sasileksha commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/65
36. नल इव प्रतिशतिः||नलकं नलाकारकस्थिविधयेत इति| Shabdkalpadrum; Vol (1-5) by Raja Radha Kanta Deva; chowkhamba Sanskrit Series; Varanasi.
37. रोचतेऽनेनेति , रोचते इति|| Shabdkalpadrum; Vol (1-5) by Raja Radha Kanta Deva; chowkhamba Sanskrit Series; Varanasi.
38. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/17
39. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
40. Vagbhata: Astanga Samgraha: with commentaries of Sasileksha commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 5/65
41. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
42. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
43. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 5/20
44. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Vimana Sthana chapter 5/8
45. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Vimana Sthana chapter 5/3
46. Vagbhata, Ashtanga Hrudaya, Sarvanga Sundari commentary of Arunadatta and Ayurveda Rasayana commentary of Hemadri, edited by Bhisayacharya Harisastris

- Paradkar Vaidya, 9th edition ,reprinted on 2005,Chowkhamba Sanskrit Series Office, Varanasi, Sharir Stana chapter 3/41
47. Vagbhata: Astanga Samgraha: with commentaries of Sasileksa commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 6/20
48. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 9/12
49. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Vimana Sthana chapter 5/8
50. Vagbhata, Ashtanga Hrudaya, Sarvanga Sundari commentary of Arunadatta and Ayurveda Rasayana commentary of Hemadri, edited by Bhisayacharya Harisastri Paradkar Vaidya, 9th edition ,reprinted on 2005,Chowkhamba Sanskrit Series Office, Varanasi, Sharir Stana chapter 3/41
51. Vagbhata: Astanga Samgraha: with commentaries of Sasileksa commentary by Indu and Chaukhambha Orientalia, Varanasi, Sharira Sthana 6/25
52. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Vimana Sthana chapter 5/17
53. Agnivesa: Caraka Samhita:Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Sutra Sthana chapter 28/16
54. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/1-2
55. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/33-34
56. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/4
57. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/7
58. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/27

59. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/27
60. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/27
61. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sharir Sthana chapter 6/27
62. Agnivesa: Caraka Samhita: Rev. by Caraka and Dradhabala with commentary by Cakrapanidatta: Chaukhamba Sanskrit Samsthana: Varanasi, Sutra Sthana chapter 28/16
63. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Sutra Sthana chapter 24/9
64. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/17
65. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/4
66. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/10
67. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Nidana Sthana chapter 16/9
68. Susruta: Susruta Samhita: with commentaries Nibandhasamgraha by Dalhana and Nyayacandrika by Gayadasa : Chaukhamba Orientalia, Varanasi : 5th Ed. (reprint 1992), Chikitsa Sthana chapter 3/118-119