

REGIONAL ANATOMY OF *SHIRO GREEVA* (HEAD & NECK) AS PER SUSRUTHA
SAMHITA

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Article Received on 25/10/2018

Article Revised on 15/11/2018

Article Accepted on 05/12/2018

ABSTRACT

Introduction: Susrutha, being a pioneer surgeon, has a great sense of regional & surgical anatomy of the human body; and same is depicted in his textual venture i.e. Susrutha Samhita. *Shaira Sthana* remains the core of anatomical knowledge but Susrutha does not illustrate further chapters on the basis of regional anatomy but instead, he described arbitrarily. *Shira* is the most important part of the body as signified by term “*Uttamanga*” by Charaka. **Aim:** Regional anatomical descriptions are present throughout the *Susrutha Samhita* but an effort is to be taken to convert scattered descriptions of *Acharya* Susrutha in terms of contemporary Regional anatomy. **Material & Method:** *Susrutha Samhita* & its commentaries and relevant contemporary literature were critically reviewed to dig out the hidden core of regional anatomy of the head & neck region. **Result:** This study clearly depicts that great sense of regional division as well as the structure was there from ancient time and will be a great help for Ayurveda Scholars. **Discussion:** Description starting from Six regional divisions to the position, location, measurement, *Asthi, Sandhi, Peshi, Sira, Avedhya Sira, Dhamani, and Marma*; has been elaborated in Susrutha Samhita. A vivid description of structures related to Head and Neck is described in the text but not in a Chapter but wherever needed.

KEYWORDS: Regional Anatomy, *Shira*, Head & Neck, Susruta Samhita.

INTRODUCTION

Susruta, being a pioneer surgeon, has a great sense of regional & surgical anatomy of the human body; and same is depicted in his textual venture i.e. Susruta Samhita; one of the three great compendia. Anatomy deals with the structural organization of the human body, being time taking & complicated to understand and study in wholesome, thus for ease it is divided into several formats like on the basis of systems, functions, regions etc among which regional division is most appreciated.

Ayurveda sages, first of all described the regional anatomy as the concept of *Shadantwa* which means the division of the whole body into six parts namely four *Shakha, Madhya Sharira & Shira*. Susruta also defines the same. These regional divisions were further elaborated with constituent structural anatomy. Now here comes the difference as we all know Ayurveda anatomy is not just the gross anatomy but it is basically clinical or functional anatomy. Likewise, the description of anatomical concepts is not in a systemic way but it is described where ever required with a description of the disease. *Sharira Sthana* remains the core of anatomical knowledge but Susruta does not illustrate further chapters on the basis of regional anatomy but instead, he described arbitrarily.

AIM

The regional anatomical description is present throughout the text but an effort is to be taken to convert scattered descriptions of *Acharya* Susruta in terms of contemporary Regional anatomy. Here we are concerned with the head & neck region as it is most important.

MATERIAL AND METHOD

Brihatrayee (the basic three classical books), specially Susruta Samhita & its commentaries and relevant contemporary literature were critically reviewed to dig out the hidden core of regional anatomy of head & neck region. A tabulated format was developed for each entity, discretely on the basis of reviewed knowledge.

Literary Review

The regional anatomy is further divided into several subheadings like location, bones, muscles, ligaments, vascular supply etc. likewise we can arrange classical textual matter related to head and neck region in these headings-

Position

Acharya Susruta has divided the whole body into three parts; among them, the third part is named ‘*Shira*’. *Dalhana* further illustrated the meaning of *Mahyam* as parts from *Kantha* to *Guda*, *Shakha* means extremities

both upper & lower & remaining part is *Shira* i.e. head; but as per *Acharya Charaka*, the third division is *Shiro-Greeva* which comprises of both head & neck region.^[1] *Charaka* has also defined *Shira* as *Uttamanga* which comprises Sarvaendriya (all sensory organs) & *Prana* of humans.^[2] In *Sarvanga Sundari* commentary of *Astanga Hrydaya Antaradhi* is defined as parts leaving *Shira*, *Bahu* & *Sakthi*, where *Bahu* & *Sakthi* comprises *Shakha*; thus leaving *Shira* denoting the head & neck region.^[3] In *Indu Krita Sasilekha* commentary of *Astanga Samgraha*, *Shira* is the part which consists of *Netra*, *Karna* etc; again hinting towards head region. This might be based on the location but has a definite functional outlook also-

- *Shira* (head & neck) – controlling systems,
- *Madhyam* (trunk) - maintenance system,
- *Shakha* (extremities) - locomotors system.

Anguli Pramana

Measurement of anything is considered as evidence for its normalcy. *Acharya Susruta* has also defined the measurement of different body parts & on basis of them has given a unique concept of assessment of *Ayu*; which is again an important part of the tenfold patient examination described.^[4] As per *Acharya Susruta* total length of head & neck region is 16 *Angula*. Further measurements of parts of the head and neck region^[5] given by *Acharya Susruta* are in **Table no 1**.

Asthi

Asthi consists of a most basic constituent of structural organization of the human body. According to *Susruta*, it is a substance which remains even after else very part like flesh, muscles etc. are shattered even after burying the body after death.^[6] It remains as the last identity of person even after demise. *Susruta* has considered 300 *Asthi* in the human bodies which are further divisible into *Shadangtwa* as,

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

As we are considered only with head and neck region the *Asthi* are enumerated^[7] in **TABLE no 2**.

Sandhi

Ayurveda considers each junction whether between bones, ligaments, muscles etc as *Sandhi*; here we are only concerned with the bony joints. *Susruta* has counted in a total of 210; which are further divisible into –

- *Shakha*- 68
- *Kustha*- 59
- Above neck- 83

Joints play important role in the coordinated movement. *Sandhi* described in *Susruta* in *Shiro-greeva*^[8] is enumerated in **Table no.3**.

Snayu

These are considered to be the most important structural entity in human body as per *Susruta*; as he describes if

the *Snayu* is damaged than it produce more adverse effect on the body then the effect produced in combine by the damage of *Asthi*, *Peshi*, *Sira* & *Sandhi*; as all other structures are tied by *Snayu* only and for surgeons to remove the *Shalya*; it is mandatory to have the knowledge of *Snayu*.

Susruta has described in total 900 *Snayu*; which are further divisible as-

- *Shakha*-600
- *Kustha*-230
- Above neck-70

He has described four types of *Snayu* among which *Pruthula Snayu* (thick / flattened) – are present in *Parshwa* (flanks), *Uras* (chest), *Prushtha* (back) and *Shir* (head).^[9]

Peshi

Peshi has an important function to cover up the *Sira*, *Snayu*, *Asthi* & *Sandhi*. These are the actually responsible for each and every action, as these are contractile so produces are action by the help of bones, ligaments etc. *Susruta* has counted 500 *Peshi*; which are further divisible into,

- *Shakha*-400
- *Kustha*-66
- Above neck-34

Above neck *Peshi*^[10] are further enumerated in **Table no 4**.

Sira

As per *Susruta*, these are the medium to provide nutrition to the different body parts.^[10] There are forty principal *Siras* in four groups; each consists of ten *Sira* for transport of *Vata*, *Pitta*, *Kapha* & *Rakta*. Further, each group ramifies into one hundred seventy-five *Siras* and they are distributed throughout the body. Among them, *Urdhwa Jatrugata* is 175 i.e. 41 each of *Vata*, *Pitta*, *Kapha* & *Rakta*. Regional division of *Sira*^[11] is enumerated in **Table no 5**.

Avedhya Sira

Susruta has also described *Avedhya Sira* i.e. unpuncturable. Clinically, some *Siras* are punctured & impure blood is let out as a part of the management of certain diseases; but some *Siras* is contraindicated for such purpose. If they are injured, may lead to complications like disability or may lead to death. A Total number of such *Avedhya sira*s is 98 which are further divisible as 16 in *Shakha*, 32 in *Kostha* & 50 above *Jatru*. The *Avedhya Sira* of *Urdhwa Jatrugata*^[12] is illustrated in **Table no. 6**.

Dhamani

Dhamanis which are connected to *Nabhi* is enumerated as 24; out of which 10 ascend, 10 descend & 4 run transversely. Ascending *Dhamanis* can be considered for supplying head & neck as seen by their functional

description in the text. These vessels when passing through *Hrudya* these are re-divided into 30; which are classified as in the table. Here, Susruta has mentioned that *Dhamanis* nourishes *Nabhi, Udara, Parswa, Prusta, Ura, Skandha, Greeva & Bahu*. Further illustration of *Dhamani*^[13] is in **Table no 7**.

Marma

Susruta has described *Marmas* as the sites where there is the conglomeration of *Mamsa, Sira, Snayu, Asthi*, and *Sandhi*; at these places, *Prana* resides especially by nature. Each of the points is explained considering its various aspects as region, structure, prognosis, measurement, and number. *Marmas* are enumerated as one hundred seven; which further classified on a regional basis as forty-four in *Shakha*, twenty-six in *Kosta* & thirty-seven above the neck. *Acharya* explains that from a surgical point of view, the location of these points should be kept in mind so as to avoid injury to the vital parts. The knowledge of *Marma* is considered as half the knowledge of *Shalyatantra*.

As the part of the regional anatomy of Head & Neck region; these points are must be considered as Susruta has not only given their location but has also described the *Pramana* and their prognosis after injury. The **Table no 8** illustrates the *Marma* points in *Shiro Greeva* region^[14] with other relevant information.

DISCUSSION

Susruta has described the procedure of Dead Body Preservation as well as Dissection in his Classical text.^[15] This means he has great complete knowledge of different structures of the human body. Being more concerned with surgery the importance of structural knowledge has to be more visionary. In regional anatomy structure of any body part is described under certain subheadings like location, bone, joint, muscle, ligament, blood supply etc Description starting from 6 regional divisions to position, location, measurement, *Asthi, Sandhi, Peshi, Sira, Avedhya Sira, Dhamani* and *Marma*; has been elaborated in Susruta Samhita though not in any specific chapter but scattered, which can be summarized as follows-

Sno	Feature	Description
1	Position	<i>Shir</i> (Head as per Dalhana other than <i>Madhyam Sharir & Shakha</i>)
2	Measurement	total length of head & neck region is 16 <i>Angula</i>
3	<i>Asthi</i>	63
4	<i>Sandhi</i>	83
5	<i>Snayu</i>	70
6	<i>Peshi</i>	34
7	<i>Sira</i>	41 (for each <i>Dosha</i>)
8	<i>Avedhya Sira</i>	50
9	<i>Dhamani</i>	30
10	<i>Marma</i>	37

Table No 1: Pramana of parts of head and neck region.

S No	Body Part	Anguli Pramana
1	Neck Girth	20
2	<i>Mukha</i> girth	4
3	Face length	12
4	Tooth length	2
5	Chin length	2
6	Ear length	4
7	Nose length	4
8	Nostril length	5
9	Nostril breadth	1 1/3
10	Head elevation	4
11	b/w inner angle of eyes	2
12	b/w two pupils	4
13	b/w ear and outer angle of eyes	5
14	b/w two ears, from behind	14
15	Root of ear- length	2
16	b/w lower end of frontal hairline & top of the head	11
17	b/w top of head & back hair line	10

Table no 2: *Asthi* present in head and neck region.

Sno	<i>Asthi</i>	No
1	<i>Grivasthi</i>	9
2	<i>Kanthanadi</i>	4
3	<i>Hanvasthi</i>	2
4	<i>Shira-kapala</i>	6
5	<i>Talvasthi</i>	1
6	<i>Shankhasthi</i>	2
7	<i>Nasasthi</i>	3
8	<i>Gandakuta</i>	2
9	<i>Karnasthi</i>	2
10	<i>Danta</i>	32
	Total	63

Table No 3: *Sandhi* present in head and neck region.

Sno	<i>Sandhi</i>	No
1	<i>Greeva</i>	8
2	<i>Kantha</i>	3
3	<i>Klomanadi</i>	18
4	<i>Dantamula</i>	32
5	<i>Kakanaka</i>	1
6	<i>Nasa</i>	1
7	<i>Vartma mandala</i>	2
8	<i>Ganda</i>	2
9	<i>Karna</i>	2
10	<i>Shankha</i>	2
11	<i>Hanusandhi</i>	2
12	<i>Above Bhru</i>	2
13	<i>Above shankha</i>	2
14	<i>Shira kapala</i>	5
15	<i>Murdha</i>	1
	Total	83

Table No 4: *Peshi* present in head and neck region.

S.No.	<i>Peshi</i>	No
1	<i>Greeva</i>	4
2	<i>Hanu</i>	8
3	<i>Krikatika</i>	2
4	<i>Talu</i>	2
5	<i>Jihwa</i>	1
6	<i>Oshtha</i>	2
7	<i>Nasa</i>	2
8	<i>Netra</i>	2
9	<i>Shankha</i>	4
10	<i>Karna</i>	2
11	<i>Lalata</i>	4
12	<i>Shira</i>	1
	Total	34

Table No 5: *Sira* present in head and neck region.

Sno	<i>Sira (region)</i>	No
1	<i>Greeva</i>	14
2	<i>Karna</i>	4
3	<i>Jihwa</i>	9
4	<i>Nasika</i>	6
5	<i>Netra</i>	8
	Total	41
	Grand total of all 4 Dosic Sira	164

Table No. 6: *Avedhya siras* present in head and neck region.

S no	Region	No	<i>Avedhya Sira</i> name
1	<i>Greeva</i>	16	<i>Marmasangyaka Sira</i> (12), <i>Krikatika</i> (2), <i>Vidhura</i> (2)
2	<i>Hanu</i>	4	<i>Sandhi Gata Sira</i> of both side(2*2=4)
3	<i>Jihwa</i>	4	<i>Rasavaha Sira</i> (2), <i>Vagvaha</i> (2)
4	<i>Nasa</i>	5	<i>Nasa Sameep Sira</i> (4), <i>Mridu Talu Sira</i> (1)
5	<i>Netra</i>	2	<i>Apanga Sira</i> (2)
6	<i>Karna</i>	2	<i>Shabda Vahini Sira</i> (2)
7	<i>Lalata</i>	7	<i>Keshantanugata</i> (4), <i>Avarta Sira</i> (2), <i>Sthapani Sira</i> (1)
8	<i>Shankha</i>	2	<i>Shankasandigata sira</i> (2)
9	<i>Shira</i>	8	<i>Utkshepa Marma Sira</i> (2), <i>Simanta Sira</i> (5), <i>Adhipati Sira</i> (1)
	Total	50	

Table No 7: *Dhamani* present in head and neck region.

S No	<i>Dhamani</i> function	No
1	<i>Vata</i> carrying	2
2	<i>Pitta</i> carrying	2
3	<i>Kapha</i> carrying	2
4	<i>Rakta</i> carrying	2
5	<i>Rasa</i> carrying	2
6	<i>Shabda</i> carrying	2
7	<i>Rupa</i> carrying	2
8	<i>Rasa</i> carrying	2
9	<i>Gandha</i> carrying	2
10	<i>Bhasya</i>	2
11	<i>Ghosh</i>	2
12	<i>Swapn</i>	2
13	<i>Pratibudh</i>	2
14	<i>Ashru</i>	2
	Total	30

Table No 8: *Marma* points present in head and neck region.

Sno	<i>Marma</i>	No	<i>Pramana</i>	Structural	Prognostic	Location
1	<i>Nila manya</i>	4	2 <i>Hasta</i>	<i>Sira</i>	<i>Vaikalyakara</i>	Both lateral part of <i>Kantha Nadi</i>
2	<i>Matrika</i>	8	2 <i>Hasta</i>	<i>Sira</i>	<i>Sadyah Pranhara</i>	On both side of neck
3	<i>Krikatika</i>	2	<i>Arda-angula</i>	<i>Sandhi</i>	<i>Vaikalyakara</i>	On junction of head & neck
4	<i>Vidhura</i>	2	<i>Arda-angula</i>	<i>Snayu</i>	<i>Vaikalyakara</i>	Posterior & inferior to ear
5	<i>Phana</i>	2	<i>Arda-angula</i>	<i>Sira</i>	<i>Vaikalyakara</i>	On both sides of the olfactory tract & deeply attached to the pathway
6	<i>Apanga</i>	2	<i>Arda-angula</i>	<i>Sira</i>	<i>Vaikalyakara</i>	Outer canthus & below lateral limit of eyebrows
7	<i>Avarta</i>	2	<i>Arda-angula</i>	<i>Sandhi</i>	<i>Vaikalyakara</i>	Above eyebrows
8	<i>Shankha</i>	2	<i>Arda-angula</i>	<i>Asthi</i>	<i>Sadyah Pranhara</i>	Above lateral ends of the eyebrows & between the <i>Karna</i> & <i>Lalata</i>
9	<i>Utkshap</i>	2	<i>Arda-angula</i>	<i>Snayu</i>	<i>Vishalyaghna</i>	Above <i>Shankha Marma</i> & at the level of hair limit
10	<i>Sthapani</i>	1	<i>Arda-angula</i>	<i>Sira</i>	<i>Vishalyaghna</i>	Between eyebrows
11	<i>Simanta</i>	5	<i>Dwe-angula</i>	<i>Sandhi</i>	<i>Kalantara</i>	Joints located in the head & they divide the skull
12	<i>Shringataka</i>	4	<i>Dwe-angula</i>	<i>Sira</i>	<i>Sadyah Pranhara</i>	The Confluence of vessels which supply nose, ears, eyes & tongue
13	<i>Adhipati</i>	1	<i>Arda-angula</i>	<i>Sandhi</i>	<i>Sadyah Pranhara</i>	Confluence of veins located at superior part of intra cranial portion
	TOTAL	37				

CONCLUSION

Regional Classification of Human Body for the purpose of the structural study is preferred for better understanding. This method is followed by all the prominent Anatomist of the world. Ayurveda being more concerned with treatment principles the anatomy is

scattered in the text as per need. As in this era, we study *Rachana Sharir* as the subject of first-year BAMS syllabus which is correlated with Modern Anatomy. For this, a separate & more classified Structural knowledge is the need of time. Here a regional classification is derived on the basis of modern parameters but with Classical

terms. This study clearly depicts that great sense of regional division as well as the structure was there from ancient time and will be a great help for Ayurveda Scholars to understand our science in contemporary terms.

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