



## Research Article

## STUDY OF CHARKOKTA ANGULA PRAMANA OF SHADANGA AND IT'S IMPACT ON PHYSICAL HEALTH

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**KEYWORDS:** *Pramana, Anga-Pratyanga, Swa- Anguli Pramana, Madhyamparva, Shadanga.*

### ABSTRACT

Body parts and their *Pramana* are specially described in Ayurveda which is an important part of *Rachana Sharir*. Description of *Angula Pramana* was found in *Vedic Kala, Purana-Upanishad Kala. Samhita Kala* like *Vrahtai (Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, Astanga Hridaya) Kashyapa Samhita, Bhela Samhita, Sharangadhara Samhita, Vangsen Samhita, and Kautilya Arthashastra. Pramanas* are not useful only in *Rog* and *Rogi Pariksha* but also useful to know about his/her *Ayu* such as *Hitaayu, Ahitaayu, Sukhayu* and *Dukhaayu*. At the time of *Acharya Charaka*, the length and breadth of different *Anga-Pratyanga* was measured by using their own fingers. This technique of measurement is known as *Anguli Pramana*. *Anguli Pramana* which is based on *Swa-Angula Pramana* is used for measuring the dimensions (*Ayam, Vistara* and *Parinaha* etc.) of the different *Anga Pratyanga* of the body. The study was conducted on 200 volunteers in the age group of 16-40 years. One *Angula* as a unit of *Angula Pramana* was obtained by measuring the width of *Madhyamparva* of middle finger of working hand. The measurements were taken in centimetres for standardization as per metric system and then converted into *Anguli Pramana* based on individual.

This article summarizes the facts related to *Anguli Pramana* from classical literature, Ayurvedic literature and modern literature along with result of our research work to identify the anatomical landmark of *Shadanga* to measure through *Anguli Pramana* and its impact on physical health in present era. At present, there are many physical anomalies either they are genetic disorders, endocrine disorders, traumatic injury which results as anatomical disfiguration of body parts that can distinguish from their *Anguli pramana* or anthropometry.

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### INTRODUCTION

*Ayurveda* is the science of life which deals mainly to achieve the goals like prevention and cure from diseases. To achieve such goals there should be knowledge of Body (*Sharir*), body parts (major parts- *Anga* & minor parts- *Pratyanga*) and their *Angula Pramana* (anthropometry). *Angula pramana* is specially described in *Ayurveda* which is an important part of *Rachana Sharir*. *Pramanas* are not useful only in *Roga* and *Rogi Pariksha* but also useful to know about healthy life. *Pramanas* are scientific methods to acquire valid knowledge. In *Ayurveda* there are mainly three accepted *Pramana- Aptodesha, Pratyaksha* and *Anumana*. But on the other hand,

*Anguli Pramana* and *Anjali Pramana* are two deferent methods of measurements. *Anguli Pramana* was used to measurement of length of any body part and *Anjali Pramana* was used to measurement of volume of body component. In past era when a single measurement technique was not as like modern era (e.g. cm. mm. etc.), there was only *Anguli Pramana* method to measurement of body parts. No two individuals are completely alike physically, physiologically, psychologically, or in vital reaction. Hence, *Ayurveda* has individualized the concept of health. With the help of the *Angula Pramana* we can differentiate pathology from normal and can plan

management for these pathologies. Hence measurements of the body parts may get an importance. Therefore, concept of Ayurveda in relation to the *Anguli Pramana* got individualized. *Anguli pramana* can also correlate with modern physical anthropology. Classical literature along with modern literatures shows that physical examination is the most important part for any person to diagnose physically healthy or not. In ancient medical science physical examination was considered in *Dashvidha Aatura Pareeksha* such as *Prakriti* (constitution), *Vikriti* (morbidity), *Sara* (constitution of *Dhatus*), *Sahanana* (physical Compactness), *Pramana* (measurments), *Sattwa* (psyche), *Aharasakti* (power of intake and digestion of food), *Vyayamasakti* (power of exercise) And *Vaya* (age).

### Concept of *Pramana Sharir*

At the time of *Acharya Charaka*, the length & breadth of different *Anga-Pratyanga* was measured by using their own fingers. This technique of measurement is known as *Anguli Pramana*.<sup>[1]</sup> On the other hand, *Anguli Pramana* which is based on *Swa-Angula Pramana* is used for measuring the dimensions (*Ayam, Vistara* and *Parinaha* etc.) of the different *Anga Pratyangas* of the body. According to *Acharya Charaka* the length of human body (*Ayam-Vistar*) is 84 *Anguli*.<sup>[2]</sup> As length & breadth of finger of every person is differ from one another. Therefore, the terms have been used *Swanguli*, it means *Ang-Pratyanga* should be measure with their own *Anguli*.<sup>[3]</sup>

### Description Regarding to *Anga*<sup>[4]</sup>

1. **Shir-** It is used to denote *Shirogreeva, Sira*.
2. **Antradhi** - It us used to trunk (except *Hasta, Paad, Shir* and *Greeva*).
3. **Shakha-** *Shakha* word denotes upper and lower extremities.
4. **Baahu-** Word denotes upper extremities. It includes *Prabaahu* (arm, brachium), *Prapaani* (forearm) and *Hasta*.  
*Hasta-* Between wrist and tip of fingers.
5. **Sakthi** – *Sakthi* word is used to lower extremities. It includes *Uru, Jangha* and *Paad*.  
*Uru-* it is between inguinal region and patella.  
*Jangha-* Between knee joint and ankle joint.  
*Paad-* It denotes foot.

Present research work has been done on the topic “Study of *Charakokta Anguli Pramana* of *Shadanga* & It’s Impact on Physical Health”. The study was conducted on 200 volunteers in the age group of 16-40 years. In this study, 200 volunteers were registered irrespective of their age, sex, religion, etc. The stature, arm span, measurement related with landmarks were taken in respective to *Swa Angula*

that was breath of 1<sup>st</sup> interphalangeal joint (*Madhyamparva*) of middle finger. The measurements were taken in centimetres for standardization as per metric system & then converted into *Angula*.

Total 200 volunteers were registered in this study, among them 43.5% volunteers have *Sama Aayama-Vistara* were 87 (43.5%). These Volunteers ranges between 82 to 86 *Anguli* with St. D 9.64 and St. error 1.03.

2.5% (5) Volunteers have *Aayama-Vistara* < 82 *Anguli* with St. D 1.4 and St. error 0.44.

In Maximum no. of volunteers 57% (108) have *Aayama-Vistara* >86 *Anguli* with St. D 2.88 and St.error 0.27.

It was found by the study that out of 200 volunteers 7 % were belonging height group of 75-79 A°, 13.5 % of volunteers were belonging to height group of 80-84 A°, 32.5 % were from height group of 85-89 A°, 41 % were belonging to height group 90-94 A°, and 9.5% were belonging to height group 95-100 A°. In this study mean score from width of 1<sup>st</sup> inter-phalangeal joint of middle finger of working Hand was 1.92, St. D 0.12, SQRTN 9.33, and St. Error was 0.01.

In this study mean score of one *Angula* that was width of 1<sup>st</sup> inter-phalangeal joint of middle finger was 1.92, St. D 0.12, SQRTN 9.33, and St. Error was 0.01.

### Observation on Subjective Criteria

#### *Angula*

Width of 1<sup>st</sup> inter-phalangeal joint of middle finger of working hand was measured as 1 *Angula*.

#### Arm Span

In this study mean score of arm span was 84.03, St. D 0.63, SQRTN 9.33, and St. Error was 0.07.

#### Height

In this study mean score of height was 84.03, St. D 1.35, SQRTN 9.33, and St. Error was 0.14.

**Head & Neck:** In this study to identify the anatomical landmarks of *Shirogreeva*, we observe 3 probable sites and calculate their mean score as following- from C<sub>7</sub> to top of the head/vertex was 12.95, St. D 0.89, SQRTN 9.33, and St. Error was 0.10, from mid clavicular line to top of the head/vertex was 15.96, St. D 0.47, SQRTN was 9.33 and St, error was 0.05, from Jugular notch to top of the head/vertex was 16.14, St, D 1.06, SQRTN was 9.33 and St. error was 0.11.

**Hands (*Baahu*):** In this study to identify the anatomical landmarks of *Baahu*, we observe 2 probable sites and calculate their mean score as following- from tip of acromion process to tip of middle finger was 43.1, St. D 0.57, SQRTN 9.33, and

St. Error was 0.06, from midpoint of axilla to tip of middle finger was 38.7, St. D 1.4, SQRTN was 9.33 and St. error was 0.15.

### **Antradhi**

In this study to identify the anatomical landmarks of *Antradhi*, we observe 4 probable sites and calculate their mean score as following- from C<sub>7</sub> to S<sub>1</sub> was 27.63, St. D 3.55, SQRTN 9.33, and St. Error was 0.38, from C<sub>7</sub> to resting surface was 34.32, St. D 0.59, SQRTN was 9.33 and St. error was 0.06, from midpoint of inguinal ligament to mid clavicular line was 24.74, St. D 3.81, SQRTN 9.33, and St. Error was 0.41, from upper border of pubic symphysis to jugular notch was 23.44, St. D 0.62, SQRTN was 9.33 and St. error was 0.07.

### **Sakthi**

In this study to identify the anatomical landmarks of *Sakthi*, we observe 6 probable site as following- from ASIS to resting/planter surface, from midpoint of inguinal ligament to resting/planter surface. Both sites were measured in standing position. From ASIS to most convex area of medial planter arch, from ASIS to most convex area of lateral planter arch, from midpoint of inguinal ligament to most convex area of medial planter arch and from midpoint of inguinal ligament to most convex area of lateral planter arch. All these 4 sites was measured in lying positions.

In this study mean score ASIS to resting/planter surface was 49.98, St. D 1.98, SQRTN 9.33, and St. Error was 0.21. Mean score from Midpoint of inguinal ligament to resting /planter surface was 44.22, St. D 0.70, SQRTN was 9.33 and St. error was 0.08. Mean score of ASIS to most convex area of medial planter arch was 49.38, St. D 2.38, SQRTN 9.33, and St. Error was 0.26. Mean score from ASIS to most convex area of lateral planter arch was 51, St. D 2.5, SQRTN was 9.33 and St. error was 0.27. Mean score from midpoint of inguinal ligament to most convex area of medial planter arch was 45.17, St. D 2.26, SQRTN was 9.33 and St. error was 0.24. Mean score of Midpoint of inguinal ligament to most convex area of lateral planter arch was 46.91, St. D 2.41, SQRTN 9.33, and St. Error was 0.26.

### **DISSCUSION ON OBSERVATION**

- Range of one *Angul* was 1.6 to 2.2cm. with mean 1.82 cm, St. D 0.14cm and St. Error.
- Range of *Aayama* (height) was 74.3 *Anguli* to 105.7 *Anguli* and of *Vistara* (width) was 74 *Anguli* to 104.9 *Anguli*. The mean of *Aayam* was 88.63 ±0.37 *Anguli* and *Vistaara* was 88.64 ±0.38 *Anguli*.
- The number of volunteers having *Sama aayama-vistara* were between 82-86 *Angula* were 87

(43.5%), and in contrast to it having >86 *Angula* were 108 (57%), <82 *Angula* were 5 (2.5%).

- 87 (43.5%) volunteers *Aayama* ranges from 82 to 86 *Anguli* with St. D 9.64 and St. error 1.03. In 5 (2.5%) volunteers had *Aayama* < 82 *Anguli* with St. D 1.4 and St. error 0.44. In Maximum no. of volunteers 108 (57%) *Aayam* was > 86 *Anguli* with St. D 2.88 and St. error 0.27. *Acharya charaka* has described *sama ayama viastara* that was 84 *Anguli* but in today's era in maximum volunteers *Aayam* is found to be more than 84 *Anguli*. This may be due to some evolutionary changes in human being.

### **Discussion on Anatomical Landmarks**

According to *Charaka* the *Aayama* of human being should be 84 *Anguli* and should be equal to *Vistaara*, such a body is called *Sama Sharir* i.e., anatomically proportionate body. This study was designed to identification of landmarks, so 87 volunteers which were 84 *Anguli Aayama* & *Vistara* have included for this aim.

### **Discussion on Shirogreeva**

To identify the anatomical landmark of *Shirogreeva* the measurement has taken from 3 places- from C<sub>7</sub> to top of the Head/vertex, mid clavicular line to top of the head/vertex and juglar notch to top of the head/vertex.

In this study mean score from C<sub>7</sub> to top of the head/vertex was 12.95, St. D 0.89, SQRTN 9.33, and St. Error was 0.10. Mean score of mid clavicular line to top of the head/vertex was 15.96, St. D 0.47, SQRTN was 9.33 and St, error was 0.05. Mean score of juglar notch to top of the head/vertex was 16.14, St, D 1.06, SQRTN was 9.33 and St. error was 0.11.

Measurement taken with *Angula Pramana* measured from mid-clavicular line to top of the head/vertex was more comparable with the measurements mentioned in the ancient literature.

### **Discussion on Baahu**

To identify the anatomical landmark of *Baahu* the measurement has taken from 3 places- from tip of acromion process to tip of middle finger and from midpoint of axilla to tip of middle finger.

In this study mean score from tip of acromion process to tip of middle finger was 43.1, St. D 0.57, SQRTN 9.33, and St. Error was 0.06. Mean score from midpoint of axilla to tip of middle finger was 38.7, St. D 1.4, SQRTN was 9.33 and St. error was 0.15.

Measurement taken with *Angula Pramana* measured from tip of acromion process to tip of middle finger was more comparable with the measurements mentioned in the ancient literature.

### Discussion on *Antradhi*

To identify the anatomical landmark of *Antradhi* the measurement has taken from 4 places- from C<sub>7</sub> to S<sub>1</sub> in anatomical position, from C<sub>7</sub> to resting surface/ischial tuberosity in sitting posture.

From midpoint of inguinal ligament to mid clavicular line and from Upper border of pubic symphysis to juglar notch in lying posture. In this study mean score from C<sub>7</sub> to S<sub>1</sub> was 27.63, St. D 3.55, SQRTN 9.33, and St. Error was 0.38. Mean score from C<sub>7</sub> to resting surface was 34.32, St. D 0.59 and St. error was 0.06. Midpoint of inguinal ligament to mid clavicular line was 24.74, St. D 3.81, and St. Error was 0.41. Mean score from upper border of pubic symphysis to juglar notch was 23.44, St. D 0.62, and St. error was 0.07.

Measurement taken with *Angula Pramana* measured from Midpoint of inguinal ligament to mid clavicular line was more comparable with the measurements mentioned in the ancient literature.

### Discussion on *Sakthi*

To identify the anatomical landmark of *Sakthi* the measurement has taken from 6 places- from ASIS to resting/planter surface, from midpoint of inguinal ligament to resting/planter surface both in anatomical position, from ASIS to most convex area of medial planter arch in lying position, from ASIS to

most convex area of lateral planter arch in lying position, from midpoint of inguinal ligament to most convex area of medial planter arch in lying position and from midpoint of inguinal ligament to most convex area of lateral planter arch in lying position.

In this study mean score ASIS to resting surface was 49.98, St. D 1.98, SQRTN 9.33, and St. Error was 0.21. Mean score from midpoint of inguinal ligament to resting surface was 44.22, St. D 0.70, SQRTN was 9.33 and St. error was 0.08. Mean score of ASIS to most convex area of medial planter arch was 49.38, St. D 2.38, SQRTN 9.33, and St. Error was 0.26. Mean score from ASIS to most convex area of lateral planter arch was 51, St. D 2.5, SQRTN was 9.33 and St. error was 0.27. Mean score from Midpoint of inguinal ligament to most convex area of medial planter arch was 45.17, St. D 2.26, SQRTN was 9.33 and St. error was 0.24. Mean score of midpoint of inguinal ligament to most convex area of lateral planter arch was 46.91, St. D 2.41, SQRTN 9.33, and St. Error was 0.26.

Measurement taken with *Angula Pramana* measured from midpoint of inguinal ligament to resting/planter surface in lying position was more comparable with the measurements mentioned in the ancient literature.

Sr.no.	Anga (major parts)	Landmarks	No. of volunteers	Mean	St.D	SE.
1	<i>Shirogreeva</i>	Mid Clavicular Line to top of the Head/vertex	87	15.96	0.47	0.05
2	<i>Baahu</i>	From tip of acromion process to tip of middle finger	87	43.1	0.57	0.06
3	<i>Antradhi</i>	Midpoint of inguinal ligament to mid clavicular line	87	24.74	3.81	0.41
4	<i>Sakthi</i>	Midpoint of inguinal ligament to resting surface	87	44.22	0.70	0.08

### Comparison with Ancient Literature

**Ayama** (height) measured between top of the head to planter/resting surface through *Angula Pramana*, satisfies the measurements mentioned in the ancient literature.

**Vistara** (width) measured between tips of both middle fingers while hands were stretched outward at level of shoulder through *Angula Pramana*, satisfies the measurements mentioned in the ancient literature.

**Shirogreeva** measurement through *Angula Pramana*, from the mid clavicular line to top of the heads/vertex satisfies the measurements mentioned in the ancient literature.

**Baahu** measurement through *Angula Pramana* from, from tip of acromion process to tip of middle finger, satisfies the measurements mentioned in the ancient literature.

**Antradhi** measurement through *Angula Pramana* from the midpoint of inguinal ligament to mid clavicular line satisfies the measurements mentioned in the ancient literature.

**Sakthi** measurement through *Angula Pramana*, from midpoint of inguinal ligament to resting/planter surface, satisfies the measurements mentioned in the ancient literature.

- Body parts and their *Pramana* are specially described in *Ayurveda* which is an important part

of *Rachana Sharir*. *Pramanas* are not useful only in *Rog* and *Rogi Pariksha* but also useful to know about his/her *Ayu* such as *Hitaayu*, *Ahitaayu*, *Sukhayu* and *Dukhayu*.

- In ancient medical science physical examination was considered in *Dashvidha Aatura Pareeksha* such as *Prakriti* (Constitution), *Vikriti* (Morbidness), *Sara* (Constitution of *Dhatu*), *Sahanana* (Physical Compactness), *Pramana* (Measurements) etc. It shows importance of *Anguli Pramana*.
- At the time of *Acharya Charaka*, the length & breadth of different *Anga-Pratyanga* was measured by using their own fingers. This technique of measurement is known as *Anguli Pramana*.
- *Anguli Pramana* which is based on *Swa-Angula Pramana* is used for measuring the dimensions (*Ayam*, *Vistara* and *Parinaha* etc.) of the different *Anga Pratyangas* of the body.
- According to *Acharya Charaka* the length of human body (*Ayam-Vistara*) is 84 *Anguli*.
- *Antradhi* (Trunk), *Sakthi* (Legs), *Bahu* (Arms) and *Siras* (head including the neck)-these are the *Anga* (major parts); parts in each these are the *Pratyanga* (minor parts).
- **Shira**- It is used to denote *Shirogreeva*, *Sira*.
- **Antradhi** - It is used to trunk (except *Hasta*, *Paad*, *Shir* and *Greeva*).
- **Shakha**- Word denotes upper and lower extremities.
- **Baahu**- *Baahu* word denotes upper extremities. It includes *Prabaahu* (arm, brachium), *Prapaani* (forearm) and *Hasta*.
- **Sakthi**- It is used to lower extremities. It includes *Uru*, *Jangha* and *Paad*.
- The study was conducted on 200 volunteers in the age group of 16-40 years.
- The *Anguli Pramana* is the specific parameter for assessment of height, length, circumference and width which is mentioned as *Utsedha*, *Aayamaa*, *Parikshepa* and *Vistara* respectively. Width of the 1<sup>st</sup> interphalangeal joint of middle finger of working hand was measured by Vernier caliper.
- Range of one *Angula* was 1.6 to 2.2 with mean 1.82, St. D 0.14 and St. Error 0.0099.
- Range of *Aayama* (height) was 74.3 *Anguli* to 105.7 *Anguli* and of *Vistara* (width) was 74 *Anguli* to 104.9 *Anguli*.
- The mean of *Aayama* was 88.63 ±0.37 *Anguli* and *Vistaara* was 88.64 ±0.38 *Anguli*.
- 87 (43.5%) Volunteers have *Aayama* between 82 to 86 *Anguli* with St. D 9.64 and St. error 1.03.
- In 5 (2.5%) Volunteers have *Aayama* <82 *Anguli* with St. D 1.4 and St. error 0.44.
- In maximum no. of volunteers 108 (57%) have *Aayama* > 86 *Anguli* with St. D 2.88 and St. error 0.27. According to *Charaka* the *Aayamaa* of human being should be 84 *Anguli* and should be equal to *Vistaara*, such a body is called *Sama Sharir* i.e., anatomically proportionate body. But at present time maximum volunteers have *Aayama* more than 84 *Anguli*. This may be due to some evolutionary changes in the human being.
- This study was designed to identify the anatomical landmarks for the measurement of *Shadanga* through *Swa Angula*, so after 200 volunteer's observation we find out 87 volunteers who have *Sama Aayama* and *Vistara* and they were included for this aim.
- In this study three different probable site was considered to measurement of *Sheerogreeva* (Head-neck) to get nearest value of *Angul Pramana* that is mentioned by *Charak*. These were as following- From C<sub>7</sub> to top of the head/vertex, from mid-clavicular line to top of the head/vertex and from jugular notch to Top of the head/vertex. After measurement of above three probable sites, we observe that a site was more comparable with the measurements mentioned by *Acharya Charaka* that was from mid-clavicular line to top of the head/vertex.
- In this study two different probable site was considered to measurement of *Baahu* (Hand) to get nearest value of *Angul Pramana* that was mentioned by *Charaka*. These sites were as following: one was from tip of acromion process to tip of middle finger and another was from midpoint of axilla to tip of middle finger. After measurement of above two probable sites, we observe that a site was more comparable with the measurement mentioned by *Acharya Charaka* that was tip of acromion process to tip of middle finger.
- In this study four different probable site was considered to measurement of *Antradhi* (trunk) to get nearest value of *Angul Pramana* that is mentioned by *Charaka*. These were as following: from C<sub>7</sub> to S<sub>1</sub> in anatomical position, from C<sub>7</sub> to resting surface in sitting posture, from midpoint of inguinal ligament to mid-clavicular line in lying position and from upper border of pubic symphysis to juglar notch in lying position. After measurement of above four probable sites, we observe that a site was more comparable with the measurements mentioned by *Acharya Charaka* that was midpoint of inguinal ligament to mid-clavicular line.

- In this study six different probable site was considered to measurement of *Sakthi* (Leg) to get nearest value of *Angula Pramana* that is mentioned by *Charaka*. These were as following: ASIS to resting/ planter surface, from midpoint of inguinal ligament to resting/ planter surface, from ASIS to most convex area of medial planter arch, from ASIS to most convex area of lateral planter arch, from midpoint of inguinal ligament to most convex area of medial planter arch and from midpoint of inguinal ligament to most convex area of lateral planter arch. After measurement of above six probable sites, we observe that a site was more comparable with the measurements mentioned by *Acharya Charaka* that was Midpoint of inguinal ligament to resting surface.
- At present time there are many physical anomalies either they are genetic disorders, endocrine disorders, traumatic injury which results as anatomical disfiguration of body parts that can distinguish from their *Anguli pramana* or anthropometry. Such as-
- Gigantism- Considerable increase in height and enlarged thoracic cage<sup>[5]</sup>.
- Acromegaly- Increased growth of extremities<sup>[6]</sup>.
- Achondroplasia- Disproportionate short stature<sup>[7]</sup>.

## CONCLUSION

On the basis of above mentioned literary review, observations, discussion and results, the final conclusion of the present work, Body parts and their *Pramana* are specially described in *Ayurveda* which is an important part of *Rachana Sharir*.

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