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An observational study on *Charakokta Anguli Pramana* of *Urdhwa Shaakha* with special reference to *Madhyamayu*.

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Introduction

Ayurveda, the ancient Indian system of medicine, emphasizes the preservation of health, promotion of longevity and understanding of individual body constitution and proportion. *Acharya Charaka*, in *Rogabhishagjitiya Vimana* of *Vimana Sthana*, explains *Dashavidha Pariksha Bhava* for *Atura Pariksha*, among which *Pramana Pariksha* is also mentioned. In the context of *Pramana Pariksha*, measurements of various body parts are described, including *Skandha*, *Prabaahu* ,*Prapaani*,*Hastaa*. However, the exact dimension intended for these measurements is not clearly specified, whether it refers to *Ayama*, *Vistara*, *Parinaha* or *Utsedha*. Hence, the present study attempts to identify which dimension among length, circumference and anteroposterior diameter shows the closest agreement with the *Pramana* mentioned by *Acharya Charaka*.

Materials and methods-100 participants of both genders aged between 25-70 years were included. Measurements were recorded using vernier callipers and measuring tape and statistically analysed.

Results

In the given sample the *Skandha* length (7.31%),*Prabaahu* length (7.97%), *Prapaani* length (10.83%)and *Hasta* circumference (9.9%) had good coincidence with the *Charakokta Pramana* of *Hasta*,*Prabaahu*,*Prapaani* and *Skandha*.

Prabaahu circumference (11.64%) and *Hasta* length (20.93%) moderately coincided with the *Prabaahu* and *Hasta pramana*.

Skandha AP diameter (32.31%),*Prabaahu* AP diameter (72.08%),*Prapaani* AP diameter (79.35%),*Prapaani* circumference (23.24%) and *Hasta* AP diameter (85.7%) coincided poorly with *Charakokta Pramana* of *Skandha*,*Prabaahu* and ,*Prapaani*.

Keywords

Angula Pramana,*Urdhwa Shaakha*,*Pramana Shareera*,Anthropometry.

Introduction

Ayurveda, the ancient Indian system of medicine, emphasizes the preservation of health, promotion of longevity and treatment of disease through a holistic and individualized approach. Before planning treatment, proper examination of the patient is considered essential.*Acharya Charaka*, in *Rogabhishagjitiya Vimana* of *Vimana Sthana*, explains *Dashavidha Pariksha Bhava* for *Atura Pariksha*, among which *Pramana Pariksha*[1] is one important method of examination.

Pramana Pariksha deals with the measurement of different body parts and helps in understanding body proportion, physical constitution, *Bala* and *Ayu pramana*[2] of an individual. The concept of *Pramana Sharira* in *Ayurveda* can be understood in relation to modern anthropometry, which is the scientific study of human body measurements. *Ayurveda* also gives importance to *Sva-angula Pramana*[3], indicating an individualized method of measurement.

In the context of *Pramana Pariksha*, *Acharya Charaka* has mentioned the measurements of various body parts[4], including *Skandha*, *Prabahu*, *Prapani* and *Hasta*. However, the exact dimension intended for these measurements is not clearly specified, whether it refers to *Ayama*, *Vistara*, *Parinaha* or *Utsedha*. Hence, the present study was undertaken to compare the measurements of length, circumference and anteroposterior diameter of selected upper limb structures with the classical values mentioned by *Acharya Charaka*, and to identify which dimension shows the closest agreement with the stated *Pramana*.

Objective

1. To evaluate and analyze the *Pramana* of *Urdhwa Shaaka (Skandha, Prabaahu,Prapaani,Hastaa)of a Madhyamayu person.*
2. To revalidate the facts related to *Anguli Pramana* from *Charaka Samhita.*
3. To revalidate the concept of *Pramana Sharira* in clinical practice.

Review of literature

Acharya Charaka and *Acharya Sushruta* have extensively described the concept of *Pramana Shareera* (body measurements and proportions) in classical *Ayurvedic* literature. Later, *Acharya Vagbhata* reorganized and refined their views, presenting them in a more structured and concise manner.

This concept holds significant importance in *Ayurveda*, as it is closely associated with the assessment of an individual's health and longevity. According to classical texts, individuals possessing ideal body proportions (*Samapramana Shareera*) are considered more likely to lead a long, healthy, and balanced life.

A substantial knowledge regarding *Pramana Shareera* is available in the classical *Ayurvedic* texts of the *Samhita* period, reflecting its importance in diagnostic, prognostic, and preventive aspects in *Ayurvedic* practice.

Acharya Charaka has explained *Pramana* or *Maana* in the first chapter, *i.e., Deerghanjeeveeteeyam Adhyaya of Sutrasthana,* while defining the science of *Ayurveda*.The measurement of *Shareera* is one among the tenfold examinations of the patient.While describing *Pramana Pariksha, Acharya* describes the *Pramana* of various *Anga* and *Pratyanga* of the *Shareera* in *Anguli Pramana* .He describes it in the form of length, breadth and circumference.[5]

In the present the study the measurements *of Skandha,Prabaahu,Prapaani* and *Hasta* were studied, their measurements according to *Acharya Charaka* are-

Both *Skandhas* should be of 8 *angula*s length.

Prabahu should be 16 *angula* each.

Prapani should be 15 *angula* each.

Both *Hasta* (palm of hand) should be 12 *angula* each.

SWAANGULI PRAMANA

Swa-anguli pramana is an *Ayurvedic* anthropometric technique using an individual's own finger as a proportional unit to measure height, length, breadth, circumference of body parts**.**

METHODS OF MEASURING *ANGULA*

There is no direct reference in *Bhrihatrayees and Laghutrayees* as to how a Swa-*angula* is to be measured.

Sharangadhara Samhita mentions the term *angula* in the context of *Maanaparibhasha,* but there is no clarity regarding its *Sthana Nischiti (*the region where it should be measuired*).* However, *Adamalla,* in his *Deepika* commentary, defines *angula* as –

1. ***Angushta Nakhatala Bhaga*** (width of the thumb at the proximal end of the nail)

अङ्गुलशब्देन अत्र अङ्गुष्ठनखतलभागं गृह्णन्ति।[6]

2.Madhyamanguli Madhyama parva

(width of the middle finger at the proximal interphalangeal joint)

केचित् मध्यमाङ्गुलिकायास्तु मध्यमपर्वमिताङ्गुलमिति।[7]

3.Chaturangula Pramana (width of four fingers)

यद्वा चतुरङ्गुलिभिः परिमितं चतुरङ्गुलमिति प्रसिद्धम्।[8]

Amarakosha, an ancient *samskrutaa* thesaurus composed by *Pandit Amarasimha*,explains measurements related to *angula* in *Manushyavarga* of *Dwitiya Khanda*.

अङ्गुष्ठे सकनिष्ठे स्यात् वितस्ति द्वादशाङ्गुलः।[9]

He quotes *Vitasti* (The distance between the tips of the adducted thumb and the extended little finger with flexed index, middle, and ring fingers at the metacarpo-phalangeal and interphalangeal joint) is equivalent to twelve *angula*.

URDHWA SHAAKHA

ऊर्ध्व +शाखा

ऊर्ध्व

ऊर्ध्व [10] refers to something that is elevated ,raised, or located above.

The word is derived from the root उच्छ्रितः [11] meaning "upward" or "raised," and उपरिष्टात् [12], meaning "located above."

शाखा

- ***Shabdakalpadrum -***

  शाखा, स्त्री, (शाखति गगनं व्याप्नोतीति । शाख + अच् । टाप् ।) वृक्षाङ्गविशेषः[13]

- ***Apte*** [14]

  A branch (as of a tree)

  An arm

- **Monier Williams[15]**

  A branch

  A limb of the body, arm or leg.

  Much like the branches of a tree, the term *Urdhva Shakha* collectively refers to the upper limbs of the human body, highlighting their specific anatomical position."

1. ***Skandha***

➢ ***Shabdakalpadrum*** [16]

स्कन्द्यतेऽसौ इति । स्कन्द + घञ् । पृषादरादित्वात् साधुः । स्कन्द + असुन् ।
धश्चा-न्तादेशः । सर्व्वे सान्ता अदन्ताश्च इति न्यायात् अकारान्तो वा ।) अवयवविशेषः

➢ **Monier-williams[17]**

स्कन्धm.,from स्कन्द् in the sense of" rising the shoulder, upper part of the back or region from the neck to the shoulder-joint (in men and animals.etc) AV

2.Prabaahu

➢ ***Charaka samhita[18]***

"प्रबाहुरंसादर्वाक् कफोणिपर्यन्तम्

3.Prapani

➢ ***Charaka samhita[19]***

प्रपाणि कफोण्यधस्तात्

4.Hasta

- ***Shabdakalpadrum***[20]

हस्तम्, क्ली, (हस + तन् ।) चर्म्मप्रसेविका । इति केचित् ॥

हस्तः, पुं, (हसति विकशतीति । हस + "हसि- मृग्रिण्वामीति ।" उणा० ३ । ८६ । इति तन् ।) शरीरावयवविशेषः । स च कर्म्मे- न्द्रियः । हात इति भाषा । ततपर्य्यायः । पाणिः २ समः ३ शयः ४ । इत्यमरमाला ॥ पञ्चशाखः ५ । इत्यमरः

- ***Shabdasagar,Apte,*Monier Williams**[21]

Hand

Materials and methods

Method of selection of study subjects

100 partipants of the age group 25-70 years of both genders were included from OPD, IPD and staff of Government Ayurvedic medical college and hospital, Bangalore.

Inclusion criteria:

•Individuals above 25 years and below 70 years of either sex.
•Individuals with no major /chronic disorders will be selected.

Exclusion Criteria:

1. Unhealthy persons with known bony disorders like Gout, etc
2. Clinical conditions like severe dehydration, malnourishment, generalized edema etc.
3. Traumatic injuries or pathologies which are likely to interfere while measuring the *Skandha,Prabahu,Prapani and Hasta* .

Materials-



Figure 1

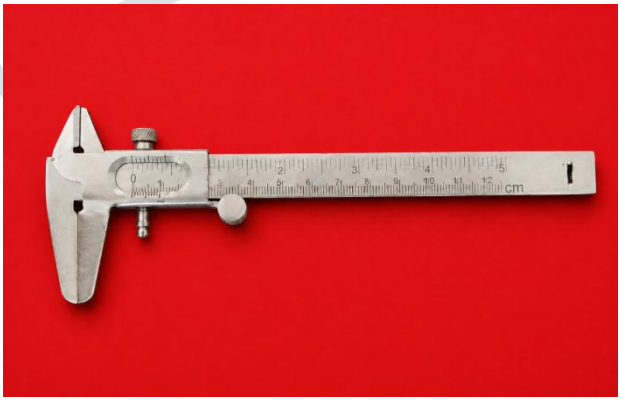


Figure 2

Method

- All subjects satisfying the inclusion and exclusion criteria were selected for the study.
- Consent was taken after explaining the scheduled procedure of the study.

- A case proforma was prepared to record the details of the volunteers.
- Prior to the study, examination of volunteers was carried out to ensure the normal stature.
- Anatomical landmarks were marked based on the references given in the classical texts and compared with the standard modern anthropometric procedure and technique.

Measurement of *Swa-anguli*:

- Subject was asked to sit relaxed.
- Ornaments were removed from the fingers of the subjects.
- The hands were kept on a flat surface and fingers were extended.
- *Madhyamanguli madhyama parva* (width of the middle finger at proximal interphalangeal joint) was taken in centimetre using vernier calliper.(**Fig.3)**

Measurement of *Skandha*:

1. **Length of *Skandha***

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left shoulders i.e. lateral aspect of neck to acromion.
- The length between the marked anatomical landmarks was measured with the help of measuring tape**.(Fig.4)**

2. **Anteroposterior diameter of *Skandha***

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left shoulders i.e. lateral aspect of neck to acromion.
- The length between the marked anatomical landmarks was measured with the help of measuring tape and centre of the measurement was marked.
- Antero-posterior diameter was measured using a vernier calliper at that point**.(Fig.5)**

Measurement of *Prabaahu*

1.Length of *prabaahu*

- Subject was asked to sit in erect position.

- The anatomical landmarks were marked on both right and left arm i.e from acromion to tip of the oleranon process of ulna
- The length between the marked anatomical landmarks was measured with the help of measuring tape**.(Fig.6)**

3. Circumference of *Prabaahu*

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left arm i.e from acromion to tip of the olecranon process of ulna.
- Length between the marked anatomical landmarks was measured with the help of measuring tape and centre of the measurement was marked. **.**
- Circumference was measured at that point using a measuring tape**.(Fig.7)**

4. Anterposterior diameter of *Prabaahu*

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left arm i.e from acromion to the tip of the olecranon process of ulna .
- The length between the marked anatomical landmarks was measured with the help of measuring tape and centre of the measurement was marked. Antero-posterior diameter was measured using a vernier calliper at that point.**(Fig.8)**

Measurement of *Prapaani*

1. Length of *Prapaani*

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left arm i.e from tip of the olecranaon to distal lateral process of the radius an measurement was taken along the lateral surface of the forearm with a measuring tape.**(Fig.9)**

2. Circumference of *Prapaani*

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left arm i.e from tip of the olecranaon to distal lateral process of the radius .

- Length between the marked anatomical landmarks was measured with the help of measuring tape and centre of the measurement was marked.
- Circumference was measured at that point using a measuring tape.**(Fig.10)**

3. Anteroposterior diameter of *Prapaani*

- Subject was asked to sit in erect position.
- The anatomical landmarks were marked on both right and left arm i.e from tip of the olecranon to distal lateral process of the radius.
- Length between the marked anatomical landmarks was measured with the help of measuring tape and centre of the measurement was marked.
- Antero-posterior diameter was measured using a vernier calliper at that point.**(Fig.11)**

Measurement of *Hasta*

1.Length of *Hasta*

- Subject was asked to sit relaxed.
- The hands were kept on a flat surface
- The anatomical landmarks were marked on both right and left hand i.e. Distal skin crease of wrist to dactylion (lowest point on the anterior margin of the middle finger)
- The length between the marked anatomical landmarks was measured with the help of measuring tape. **(Fig.12)**

2. **Circumference of *Hasta***

- Subject was asked to sit in erect position.
- The hands were kept on a flat surface.
- The anatomical landmarks were marked on both right and left hand i.e. Distal skin crease of wrist to dactylion (lowest point on the anterior margin of the middle finger)
- The length between the marked anatomical landmarks was measured with the help of measuring tape .Centre of the measurement was marked. .
- circumference was measured at that point using a measuring tape.**(Fig.13)**

3.Anteroposterior diameter of *Hasta*

- Subject was asked to sit in erect position.
- The hands were kept on a flat surface.
- The anatomical landmarks were marked on both right and left hand i.e. Distal skin crease of wrist to dactylion (lowest point on the anterior margin of the middle finger) .

The length between the marked anatomical landmarks was measured with the help of measuring tape .Centre of the measurement was marked and Antero-posterior diameter was measured using a vernier calliper at that point.**(Fig.14)**



Figure 3



Figure 4



Figure 5

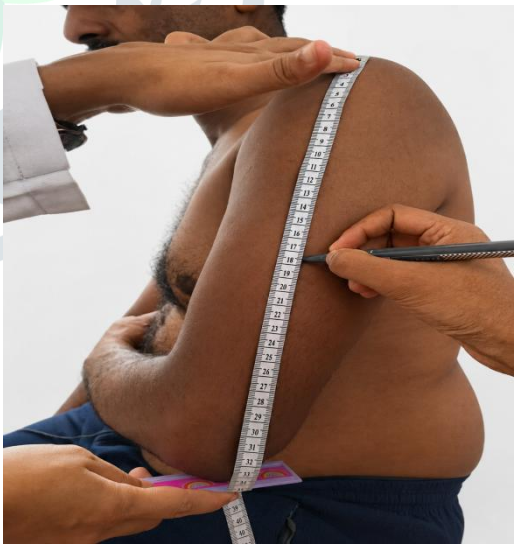


Figure 6

Figure 5

Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12



Figure 13



Figure 14

Statistical observation

Structure	Mean	Standard deviation	Mean absolute deviation	%deviation	p value	conclusion
Skandha AP diameter	5.4	0.56	2.58	32.31%	<0.0001	Highly significant decrease from standard value
Skandha length	8.23	0.075	0.58	7.31%	0.0019	Statistically significant deviation, but close to standard
Prabaahu AP diameter	4.45	0.67	11.53	72.08%	<0.0001	Highly significant decrease from standard value
Prabaahu circumference	16.54	2.27	1.86	11.64%	<0.05	Significant deviation, slightly higher than standard
Prabaahu length	15.79	1.596	1.27	7.97%	0.206	Not statistically significant; comparable

						to standard value
Prapaani AP diameter	3.1	0.38	11.90	79.35%	<0.0001	Highly significant decrease from standard value
Prapaani circumference	11.58	1.19	3.48	23.24%	<0.0001	Highly significant decrease from standard value
Prapaani length	13.5	1.15	1.62	10.83%	<0.001	Significant decrease from standard value
Hasta AP diameter	1.7	0.22	10.28	85.7%	<0.0001	Highly significant decrease from standard value
Hasta circumference	10.89	0.708	1.188	9.9%	<0.0001	Highly significant decrease,

						though percentage deviation is mild
Hasta length	9.78	1.386	2.51	20.93%	<0.0001	Highly significant decrease from standard value

Percentage deviation and interpretation

Structures	Percentage deviation	Interpretation
Skandha length	0-10%	Good coincidence with standard
Prabaahu length		
Prapaani length		
Hasta circumference		
Prabaahu circumference	11-20%	Moderate coincidence
Hasta length		
Skandha AP diameter	>20%	Poor coincidence
Prabaahu AP diameter		
Prapaani AP diameter		
Prapaani circumference		
Hasta AP diameter		

Based on all these statistical tests we can interpret that in the given sample the *skandha* length (7.31%),*Prabaahu* length (7.97%), *Prapaani* length (10.83%)and *Hasta* circumference (9.9%) had good coincidence with the *Charakokta Pramana* of *Hasta*,*Prabaahu*,*Prapaani* And *Skandha*.

Prabaahu circumference (11.64%) and *hasta* length (20.93%) moderately coincide with the *Prabaahu* and *Hasta pramana*.

Skandha AP diameter (32.31%),*prabaahu* AP diameter (72.08%),*Prapaani* AP diameter (79.35%),*prapaani* circumference (23.24%) and *Hasta* AP diameter (85.7%) coincide poorly with *Charakokta Pramana* of *Skandha*,*Prabaahu* and ,*Prapaani.*

Discussion

Skandha

- For defining *Skandha* in the present study, references from Monier-Williams and *Apte Sanskrit*-English dictionaries were consulted, where *Skandha* is explained as shoulder. However, the exact anatomical extent of the shoulder region is not clearly specified in the *Saṃhita*. Therefore, for the purpose of anthropometric measurement, *Skandha* was operationally considered as the shoulder region, and suitable modern anthropometric landmarks were adopted for measurement.
- *Acharya Charaka* has mentioned the *Pramana* of *Skandha* in the context of *Pramana Pariksha* under *Dashavidha Pariksha*. However, the exact dimension intended is not clearly specified, that is, whether the given *Pramana* refers to *Ayama*, *Vistara*, *Parinaha* or *Utsedha*.
- Hence *Skandha* was assessed by measuring different dimensions and comparing them with the standard *Pramana* mentioned by *Acharya Charaka*.
- The *Skandha* AP diameter showed a mean value of 5.415 with a mean absolute deviation of 2.585 from the standard value of 8, corresponding to 32.31% deviation. This indicates poor coincidence with the classical standard.
- In contrast, *Skandha* length showed a mean value of 8.239 with a mean absolute deviation of 0.585 and percentage deviation of 7.31%, indicating good closeness with the standard value.
- Therefore, the findings suggest that the *Skandha Pramana* mentioned in *Charaka Saṃhita* may most probably correspond to the length of *Skandha* rather than its anteroposterior diameter.

Prabaahu

- *Prabaahu* is one of the upper limb parts mentioned by *Acharya Charaka* in the context of *Pramana Pariksha*. However, the exact dimension intended for *Prabaahu* is not clearly specified, whether it refers to *Ayama, Vistara, Parinaha* or *Utsedha.* Hence, in the present study, different dimensions of *Prabaahu* were measured and compared with the standard value of 16 *Aṅgula* mentioned by *Acharya Charaka*.
- *Prabaahu* AP diameter showed very poor coincidence, with a mean value of 4.467, MAD of 11.533 and percentage deviation of 72.08%.
- *Prabaahu* circumference showed moderate closeness, with a mean value of 16.540, MAD of 1.862 and percentage deviation of 11.64%.
- However, *Prabaahu* length showed the closest agreement with the classical standard, with a mean value of 15.797, MAD of 1.275 and percentage deviation of 7.97%. The one-sample t-test for

Prabaahu length showed no statistically significant difference from the standard value, indicating good agreement.

- Hence, among the dimensions assessed, *Prabaahu* length appears to be the most probable dimension intended by *Acharya Charaka* while mentioning *Prabaahu pramana* .

Prapaani

- *Prapaani* is one of the upper limb parts mentioned by *Acharya Charaka* under *Pramana Pariksha***.** However, the exact dimension intended is not clearly specified, whether it refers to *Ayama*, *Vistara*, *Parinaha* or *Utsedha*.
- In the present study, various dimensions *Prapaani* of were compared with the standard value of 15 *Angula* mentioned by *Acharrya Charaka*.
- *Prapani* AP diameter showed very poor coincidence, with a mean value of 3.097, MAD of 11.903 and percentage deviation of 79.35%.
- *Prapani* circumference showed poor coincidence, with a mean value of 11.528, MAD of 3.486 and percentage deviation of 23.24%.
- Among the three dimensions, *Prapani* length showed the closest agreement with the classical standard, with a mean value of 13.505, MAD of 1.625 and percentage deviation of 10.83%.
- However, the observed mean was statistically significantly lower than the standard value. Hence, *Prapani* length may be considered the most probable dimension intended by *Acharya Charaka*, although it shows moderate deviation from the classical standard.

Hasta

- *Hasta* is one of the structures mentioned by *Acharya Charaka* under *Pramana Pariksha***.** However, it is not clearly mentioned whether the given *Hasta pramana* refers to *Ayama*, *Vistara*, *Parinaha* or *Utsedha*. Therefore, in the present study, different dimensions of *Hasta* were measured and compared with the classical standard value.
- In the present study, *Hasta* AP diameter, circumference and length were compared with the standard value of 12 *Aṅgula* mentioned in the main text.
- *Hasta* AP diameter showed very poor coincidence, with a mean of 1.7, MAD of 10.28 and percentage deviation of 85.7%.
- *Hasta* length showed a mean of 9.78, MAD of 2.51 and percentage deviation of 20.93%, indicating considerable deviation from the main textual standard**.**
- Among the three parameters, *Hasta* circumference showed the closest agreement with the standard value of 12 *Aṅgula*, with a mean of 10.89, MAD of 1.188 and percentage deviation of 9.9%. Although the difference was statistically significant, the practical deviation was mild. Hence, with reference to the main text, *Hasta* circumference appears to be the closest corresponding dimension.

- However, a *Paṭhantara* mentions the *Pramana* of *Hasta* as 10 *Aṅgula*, though this reading is not present in the main text.
- When this alternate reading is considered, *Hasta* length, with a mean value of 9.78, shows close proximity to 10 *Angula*.
- Thus, the main text value of 12 *Angula* appears to correspond more closely with *Hasta* circumference, whereas the *Paṭhantara* value of 10 *Angula* appears to support *Hasta* length.
- According to *Acharya Sushruta hasta* is defined as "*hastaha atra kurparadi madhyamaanguli antaha paryant"* and he has given the measurement as 24 *angula*

Conclusion

The present study was designed to evaluate the anthropometric parameters described by *Acharya Charaka* —specifically,*Skandha,Prabaahu,Prapaani and Hasta.* By employing modern anthropometric tools and statistical analysis, the study critically examined the applicability of *Angula Pramaṇa* in clinical practice.

When the main textual value is considered, *Hasta* circumference showed closeness with the standard *Pramana*. However, when the *Pathantara* value of *Hasta* is taken into consideration, the measurements of *Skandha*, *Prabahu*, *Prapani* and *Hasta* show more uniform coincidence with the length dimension. Hence, the findings suggest that the *Pramana* mentioned for these structures may most probably indicate *Ayama*, that is, length.

The study also highlights the relevance of *Pramana Pariksha* as an important component of *Dashavidha Pariksha*. By applying modern anthropometric methods to classical *Ayurvedic* measurements, the study provides a scientific approach in understanding *Pramana Sharira*. In clinical practice, *Pramana Pariksha* may help in assessing body proportion, physical constitution and individual structural variation. The findings also support the importance of individualized assessment through *Sva-angula Pramana*. Hence, this study may serve as a basis for further research in *Ayurvedic* anthropometry and its application in clinical assessment, ergonomics and personalized healthcare.

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