



A Cross-Sectional Study To Establish A Standard Method To Determine The Swa-Angula.

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Abstract:

Introduction: *Swa-angula*¹ *Pramana*, a measurement system based on a person's own finger, has several uses in traditional Indian sciences, especially in *Ayurveda*. This anthropometric system faces practical challenges due to the variability of human dimensions. The lack of standardization of methods leads to inconsistencies in clinical and academic applications. We do not come across any direct reference in *Bhrihatrayees* and *Laghutrayees* as to how a *Swa-angula* is to be measured. This article proposes a standardized method to determine *Swa-Angula* by following the four methods mentioned in 'Deepika' commentary on Sharangadhara Samhita and Amarakosha against the standard measurement of *lalaata*^{2,3,4} (i.e., *four angula*), which is mentioned in *Bhrihatrayees*.

Materials and methods -100 Participants of both genders, aged 18 to 70, were included. Measurements were recorded using vernier callipers and measuring tape and statistically analysed.

Results - *Vitasti Pramana* is the most appropriate method among those tested, followed by *Angushta nakhatalabhaga*, *Chaturangula*, and *Madhyamanguli Madhyama Parva*.

Keywords – *Swa-angula*, *Vitasti*, *Angushta nakhatalabhaga*, *Chaturangula*, and *Madhyamanguli Madhyama parva*.

Introduction:

In the Indian discipline of *Ayurveda*, a precise understanding of the human body is essential for both *Nidaana* (disease diagnosis) and *Chikitsaa* (treatment). *Pramana Shareera* (the science of bodily measurements) is a critical component of *Ayurveda Shareera Vignyana*. It provides a systematic understanding of anatomical dimensions, physiological norms, and the ideal proportions of the human body, thereby guiding clinical reasoning, diagnosis, and therapeutic decisions.

Anatomical dimensions of the human body are measured in terms of *Anguli* and *Anjali*. *Anguli pramana* is used for linear measurements, which form the basis of *Ayu Pareeksha*, and *Anjali pramana* is used for volumetric measurement, which is used to assess the health status of an individual. Though the concept of *Anguli Pramana* is widely discussed in *Bhrihatrayees* as well as *Laghutrayees*, we do not find direct references regarding the *Sthana Nischiti* (point at which measurement should be taken) of an *Angula*. We

come across a few references regarding *angula* in “*Deepika*” commentary by *Adamalla* on *Sharangadhara Samhita* and in *Amarakosha* (a *Samskrutaa* thesaurus) composed by *Amarasimha*.

Considering the preceding references, it is necessary to find the standard method of determining *Swa-Angula*. Hence, this paper aims to establish the *Sthana Nischiti* of *Swa-angula* for its easy practical applicability.

Objectives –

Primary objectives

1. To establish which among the four methods of measurement is more accurate to be considered as *Swa-angula*.
2. To review literature on *Angula Pramana*.

Secondary objectives

1. To compare four different methods of measurement.

Review of literature –

All the possible reviews of the available literature on the *Angula Pramana* were done from classical texts of *Ayurveda* and *Amarakosha*. Data was also collected from various books and papers published in e-journals, etc.

Among the various units of measurement, “*Angula*,” (*Angau haste leeyate iti*)⁵ which means a ‘finger’,⁶ is widely used as a standardized yet personalized unit of measurement. *Swa-Angula Pramana*, or the individual’s *angula*, holds particular importance in *Ayurveda* classics. *Swa-angula Pramana* was emphasized by *Acharya Charaka*, *Acharya Sushruta*, *Acharya Vagbhata*, *Acharya Sharangadhara*, and several others.

Acharya Charaka emphasizes the use of *Shareera Pramana* for understanding *prakriti* (body constitution) and *vikriti* (understanding disorders). According to him, the correct assessment of body proportions helps determine an individual's physiological and pathological status. For example, individuals whose body parts conform to ideal measurements are considered more likely to enjoy *Ayu*, *Bala*, *Ojas*, *Sukha*, *Aishwarya*, and *Vitta*⁷.

Acharya Sushruta elaborates more technically on *Shareera Pramana* and uses *Angula Pramana* extensively for surgical precision and *Rogi pareeksha* (patient examination) with special focus on *Ayu-pariksha*⁸ (examination to determine the lifespan of an individual). He details measurements of bodily parts using the *angula* as a reference, particularly in *Shareera Sthana* and *Sutra Sthana*. For instance, an individual's ideal height is 120 *angula*⁹, and specific lengths of various body parts, instruments, and surgical procedures are mentioned.

In *Ashtanga Hridaya* and *Ashtanga Sangraha*, a similar description regarding the *pramana* of *anga-pratyanga* is mentioned.

Sharangadhara Samhita mentions the term *angula* in the context of *Maanaparibhasha*, but there is no clarity regarding its *Sthana Nischiti*. However, *Adamalla*, in his *Deepika* commentary defines *angula* as -

1. *Angushta Nakhatala Bhaga* (width of the thumb at the proximal end of the nail)¹⁰
2. *Madhyamanguli Madhyama parva* (width of the middle finger at the proximal interphalangeal joint)¹¹
3. *Chaturangula Pramana* (width of four fingers)¹².

Amarakosha, an ancient *samskrutaa* thesaurus composed by *Pandit Amarasimha*, elaborates measurements related to *angula* in *Manushyavarga* of *Dwitiya Khanda*. He quotes *Vitasti*¹³ (The distance between the tips of the adducted thumb and the extended little finger with flexed index, middle, and ring fingers at the metacarpophalangeal and interphalangeal joint) is equivalent to twelve *angula*.

In the present study, the *pramana* of *lalaata* is taken as a standard measurement since it is convenient to measure. The *pramana* of *lalaata* is *four angula* according to *Bhrihatrayees*.

Material and methods:

Method of selection of study subjects –

100 Participants of the age group 18 to 70 years of both genders were included from OPD, IPD, students, and staff of the Government Ayurveda Medical College and Hospital, Bengaluru.

Inclusion criteria –

1. Healthy participants aged between 18 to 70 years.

Exclusion criteria –

1. Individuals suffering from stiffness of joints.
2. Clinical conditions like severe malnourishment, generalized edema, etc
3. Traumatic injuries or pathologies which are likely to interfere with measuring the *Anguli* and *Vitasti*.
4. Bald individuals.
5. Handicapped personnel.

Materials –

Vernier callipers, measuring tape, calculator, case record form.



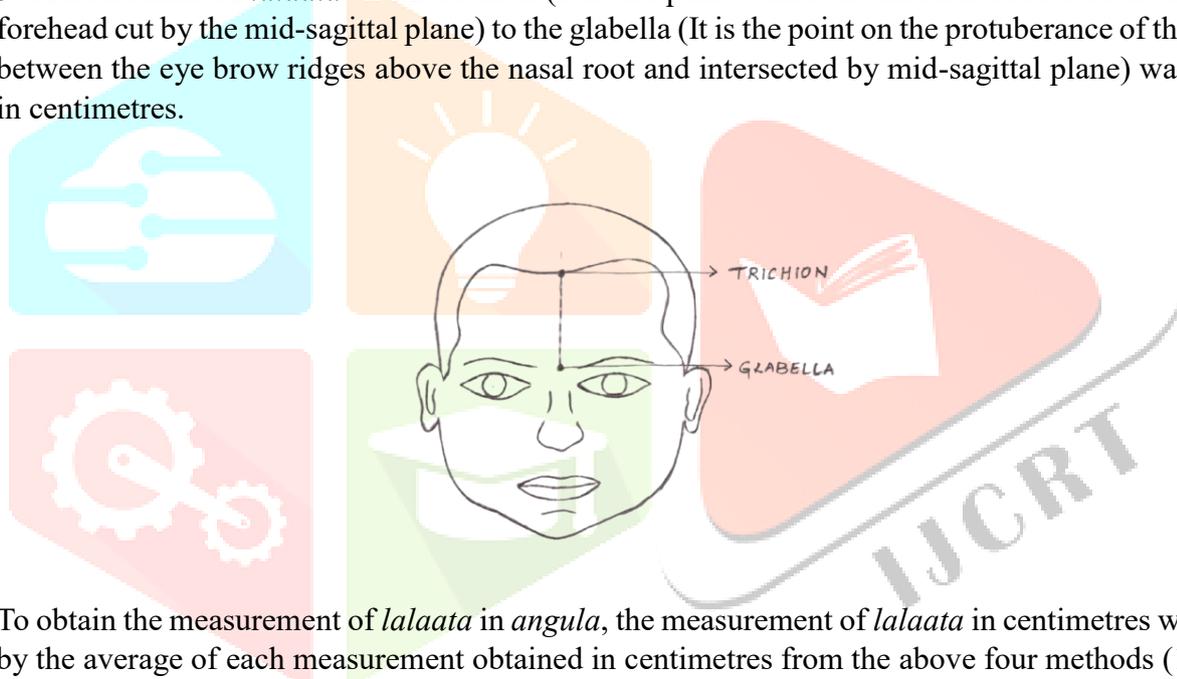
Method –

In the present study, 100 participants were selected by voluntary participation to standardize the method to determine the *Swa-angula*. The measurements were recorded as follows.

1. The width of the thumb at the proximal end of the nail.
2. The width of the middle finger at the proximal interphalangeal joint.
3. The measurement obtained by taking the width of four fingers at the level of the proximal interphalangeal joint of the index finger and one *angula* is calculated by dividing the obtained value by 4.
4. The tip of the adducted little finger and the tip of the extended thumb with flexed index, middle, and ring fingers at the metacarpophalangeal and interphalangeal joints were marked on a paper, and readings were taken. One *angula* is calculated by dividing the obtained value by 12.

In this way, four readings of both the right and left hand were recorded in centimetres. The average reading of the right and left hands was calculated and entered in the case record format.

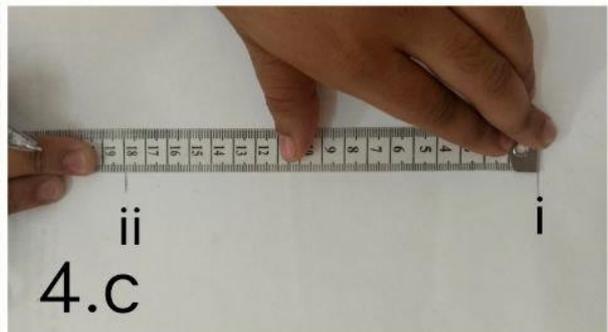
5. Measurement of *lalaata*- from trichion (It is the point where the anterior border of the hair on the forehead cut by the mid-sagittal plane) to the glabella (It is the point on the protuberance of the forehead between the eye brow ridges above the nasal root and intersected by mid-sagittal plane) was recorded in centimetres.



To obtain the measurement of *lalaata* in *angula*, the measurement of *lalaata* in centimetres was divided by the average of each measurement obtained in centimetres from the above four methods (1-4).

Precautions:

1. Rings and other ornaments were removed from the fingers.
2. The vernier calliper was held perpendicular to the finger.
3. The vernier calliper wasn't left too loose or gripped too tightly. It was noted that there was no gap between the calliper and the finger.
4. Measurements were recorded by keeping the hand on a flat surface.



Statistical observations –

Statistical test used - One-sample t-test

Method	Mean	Std Dev	t-Statistic	p-Value	Significance ($\alpha=0.05$)
<i>Angushta Nakha talabhaga</i>	3.5972	0.5273	-6.787	<0.0001	Significant
<i>Chaturangula</i>	3.4694	0.4513	-11.899	<0.0001	Significant
<i>Madhyamanguli</i>	3.4340	0.4433	-10.964	<0.0001	Significant
<i>Vitasti pramana</i>	3.7462	0.4479	-5.064	<0.0001	Significant

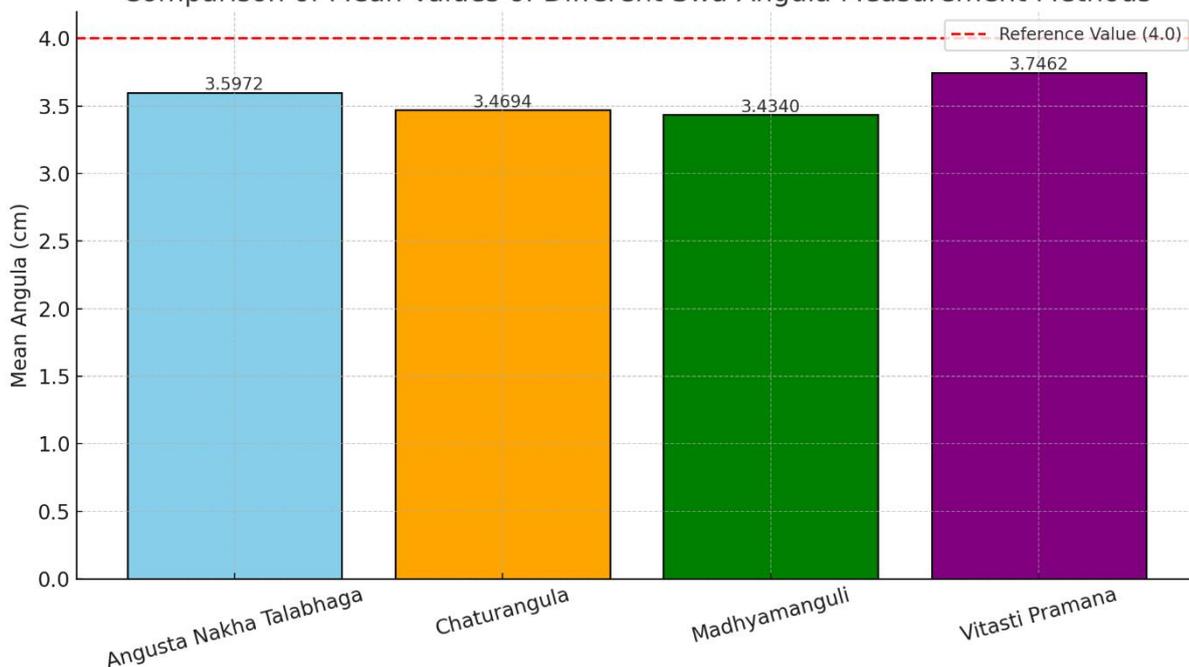
All four measurements have means significantly different from 4.0 (standard value), with p-values well below 0.05, indicating that the deviations from 4.0 are statistically significant.

Interpretation

Accuracy Compared to Reference Value:

- The mean *Angushta nakhatalabhaga pramana* is 10.07% less than 4.0, showing a **notable underestimation**.
- The mean of *Chaturangula pramana* is approximately 13.26% lower than the reference value of 4.0.
- The mean of *Madhyamanguli* is approximately 14.15% lower than the reference value.
- The mean of *Vitasti pramana* is only 6.35% lower than the reference, making it the **closest** among the methods analysed.

Comparison of Mean Values of Different Swa-Angula Measurement Methods



Discussion:

Among the four traditional measurement methods evaluated—*Angushta Nakha Talabhaga*, *Chaturangula*, *Madhyamanguli*, and *Vitasti Pramana*—all showed statistically significant differences from the reference value of 4.0 *angula*. However, their performance varied in terms of accuracy and consistency:

- *Angushta Nakha Talabhaga* is the second most accurate but shows greater underestimation and the highest variability, making it less consistent and less ideal for precise applications.
- *Chaturangula* and *Madhyamanguli* show the greatest underestimation (~13–14% lower than 4.0) despite having relatively consistent measurements. Their systematic bias makes them unsuitable for accurate absolute measurements unless correction factors are applied.
- *Vitasti Pramana* is the most accurate and reliable, with the mean value closest to 4.0 and moderate variability. It shows minimal practical deviation despite statistical significance, making it the best suited for standardization.

Conclusion:

This study was conducted to figure out the most reliable way to determine *Swa-Angula* as we do not come across direct references of how a *Swa-Angula* is to be measured in the *Bhrihatrayees*. In *Deepika* commentary on *Sharangadhara Samhita* (one among *Laghutrayees*) and *Amarakosha* (a *Samskrutaa* thesaurus), we find references of *Swa-angula* measurement, which are considered here in the present study. Four traditional methods were tested and compared with a standard reference value (*lalaata*) from the *Bhrihatrayees*. Among them, the method of *Vitasti Pramana* (The distance between the 5666666tip of the adducted little finger and the tip of the extended thumb with flexed index, middle, and ring fingers at the metacarpophalangeal and interphalangeal joints) mentioned in *Amarakosha*, was found to be the closest to the reference value, followed by *Angushta nakhatalabhaga*, *Chaturangula*, and *Madhyamanguli Madhyama parva*, respectively. Therefore, *Vitasti Pramana* can be recommended as the most suitable and practical method for measuring *Swa-Angula Pramana*, helping to make assessments more uniform and reliable.

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