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# Current updates on *Anguli Pramana*, an ancient tool of measurements

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## ABSTRACT

**Introduction:** *Anguli Pramana* is an ancient form of anthropometry. Though it is an age old technique of measurement, it is one of the unique hypothetical concepts put forth by acharyas. It is included in the syllabus of *Rachana Sharir* and students are studying over years. There is a need of updating the existing knowledge. Hence, the present study was a small step in this direction. **Materials and Methods:** Along with ethical clearance, the study was conducted on 770 healthy participants of age group 18-50 years in Ahmednagar and Nashik Region. Considering middle finger width of the right hand at proximal interphalangeal joint as *Swa-anguli Pramana*, measurements were taken for selected body parts related to the lower limb. Data obtained was analysed applying Z score test. **Results:** In the present study, measured values for selected parameters when compared with the standard values stated by acharya found statistically different. **Discussion:** Result of the present study reveal that the anthropometric values stated in ancient time are not valid in the present era. This may be due to evolutionary changes and changes in life style. The present study gives tentative information regarding the same. The result obtained is confined to the selected sample size and for selected parameters. The research can be extended further to arrive at a proper conclusion.

**Key words:** *Anguli Pramana*, Anthropometry, Measured value, Standard value, *Swa-Anguli Pramana*, Ayurveda.

## INTRODUCTION

*Anguli Pramana* is an ancient form of anthropometry. *Acharya Charaka* has stated the concept of '*Sama Ayam Vistar*' i.e., proportionate body.<sup>[1]</sup> *Acharyas* have mentioned the description of *Anguli Pramana* in the context of *Ayu* (life span) assessment. According to them, physician should check for the *Ayu* of the patient before proceeding for treatment.<sup>[2,3]</sup> Though it is an age

old technique of measurement, it is one of the unique hypothetical concepts put forth by *Acharyas*. It is included in the syllabus of *Rachana Sharir* and students are studying it over years. There is a need of updating the existing knowledge. Hence, the present study was a small step in this direction. In the present era, variations are found in the measurements of various parts of the human body in terms of *Anguli Pramana*. It may be due to evolutionary changes as well as life style changes acquired by human being.<sup>[4,5]</sup>

In ancient classics body measurements in terms of *Anguli Pramana* are stated in a single number. It should be in the form of a range. In this respect, in the present study researcher has taken *Anguli Pramana* of some body parts related to the lower limb for its validity check in the present era. Also, derived Interquartile range for the selected parameters. Though, it is applicable to the selected sample size only, it can be helpful for extending further research.

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## AIMS AND OBJECTIVES

**Aim:** Generation of evidence to validate and evaluate the concept of *Anguli Pramana* in the present era.

**Primary objective:** To validate *Anguli Pramana* in the present era.

**Secondary objective:** To evaluate *Anguli Pramana* on a bigger population.

## MATERIALS AND METHODS

### Study design

Observational type of study design was chosen for the present study.

### Sampling technique

As the study was performed in the form of survey and because of voluntary participation, non-probability sampling technique was used for getting samples.

### Sample size

In total 770 participants were selected for the study. All of them were between age group 18-50 years. All the participants were from same geographical areas i.e., Ahmednagar and Nashik region. Also, from the same socio-economic status i.e., middle class.

### Inclusion criteria

Age group between 18-50 years of gender, same geographical areas, same socio-economic class.

Participants were selected from the age group 18-50 years, as they had considered to be attained maturity in terms of growth at par.<sup>[6]</sup> Degenerative changes occur gradually in the human body after the age of 50 years. Hence, participants were selected from the aforesaid group.

As geographical factors play an important role in the physique and physiology of individual, participants were selected from the same geographical area.<sup>[7]</sup> Also, they were from the same socio-economic group, as it affects the standard of living as well as nutritional status of an individual.<sup>[8]</sup>

### Exclusion criteria

Wheelchair bound individuals, person with disability, person having difficulty in standing steady or straight.

Wheelchair bound individuals were excluded from the study as it may cause difficulty while taking measurements like length of parameters related to the lower limb.

### Assessment parameters

Following parameters were selected for the present study,

- *Uru Ayam* (Length of thigh)
- *Uru Parinah* (Thigh circumference)
- *Janu Ayam* (Length of knee)
- *Janu Parinah* (Knee circumference)
- *Jangha Ayam* (Length of leg)
- *Jangha Parinah* (Leg circumference)
- *Gulpha Parinah* (Ankle circumference)
- *Pad Ayam* (Length of foot)
- *Pad Vistar* (Width of foot)
- *Pad Parinah* (Circumference of foot)

Along with ethical clearance, the study was conducted on 770 healthy participants of age group 18-50 years in Ahmednagar and Nashik Region. Considering middle finger width of the right hand at proximal interphalangeal joint as *Swa-Anguli Pramana*, measurements were taken for above mentioned selected body parts particularly related to the lower limb.<sup>[9]</sup> Data obtained was recorded on a case record form. Data was tested for its normality using Shapiro Wilks normality test. *Anguli Pramana* of selected parameters as stated by Acharya Charaka and Sushruta were considered as standard values. The measured mean was compared with this standard value for each selected parameter separately so as to check its validity in the present era. Measurements taken were

converted into *Anguli Pramana* for further processing.

Data obtained was analysed applying Z score test.

## OBSERVATIONS AND RESULTS

The outcome of the study compiled, tabulated and analysed as follows,

**Table 1: Comparison of Actual average mean with the value stated by Acharya Charaka**

SN	Parameter	Std. Value	Actual Mean	S.D.	S. E.	Z Value	p Value	Remark
1.	<i>Uru Ayam</i>	18	26.9806	3.0349	0.1094	82.1111	0.0000	Significant
2.	<i>Uru Parinah</i>	30	27.6018	3.4358	0.12380	-19.3688	0.0000	Significant
3.	<i>Janu Ayam</i>	4	4.8965	1.8684	0.0673	13.3144	0.0000	Significant
4.	<i>Janu Parinah</i>	16	21.3278	2.5602	0.0923	57.7449	0.0000	Significant
5.	<i>Jangha Ayam</i>	18	21.5326	2.4155	0.0871	40.5817	0.0000	Significant
6.	<i>Jangha Parinah</i>	16	19.7282	2.3269	0.0839	44.4604	0.0000	Significant
7.	<i>Pad Ayam</i>	14	13.7273	1.1681	0.0421	-6.478	0.0000	Significant
8.	<i>Pad Vistar</i>	6	5.8947	0.8886	0.03202	-3.2885	0.0010	Significant

Note: *Gulpha Parinah* and *Pad Parinah* not stated by Acharya Charaka

From the Table-1 it can be observed that there is a significant difference in the standard value stated by *Acharya Charaka* and the actual mean for selected parameters.

**Table 2: Comparison of Actual average value with the value stated by Acharya Sushruta**

SN	Parameter	Std. Value	Actual Mean	S.D.	S. E.	Z Value	p Value	Remark
1.	<i>Uru Ayam</i>	18	26.9806	3.0349	0.1094	82.1111	0.0000	Significant
2.	<i>Uru Parinah</i>	32	27.6018	3.4358	0.1238	-35.5216	0.0000	Significant
3.	<i>Janu Parinah</i>	14	21.3278	2.5602	0.0923	79.4217	0.0000	Significant
4.	<i>Jangha Ayam</i>	18	21.5326	2.4155	0.08705	40.5817	0.0000	Significant
5.	<i>Jangha Parinah</i>	16	19.7282	2.3269	0.0839	44.4604	0.0000	Significant
6.	<i>Gulpha Parinah</i>	14	13.5222	1.5986	0.0576	-8.2938	0.0000	Significant
7.	<i>Pad Ayam</i>	14	13.7273	1.1681	0.0421	-6.4780	0.0000	Significant

8.	<i>Pad Vistar</i>	5	5.8947	0.8886	0.0320	27.9413	0.0000	Significant
9.	<i>Pad Parinah</i>	14	13.7622	1.4122	0.0509	-4.6728	0.0000	Significant

Note: *Janu Ayam* is not stated by *Acharya Sushruta*.

From the Table-2 it can be observed that there is a significant difference in the standard value stated by *Acharya Sushruta* and the actual mean for selected parameters.

**Table 3: Interquartile Range for selected parameters**

SN	Parameter	Max	Min	Inter Quartile Range
1.	<i>Uru Ayam</i>	29.23	26.82	2.41
2.	<i>Uru Parinah</i>	29.6	27.48	2.12
3.	<i>Janu Ayam</i>	5.32	4.87	0.45
4.	<i>Janu Parinah</i>	22.65	21.34	1.31
5.	<i>Jangha Ayam</i>	23.12	21.51	0.61
6.	<i>Jangha Parinah</i>	21.19	19.64	1.55
7.	<i>Gulpha Parinah</i>	14.36	13.45	0.91
8.	<i>Pad Ayam</i>	14.46	13.68	0.78
9.	<i>Pad Vistar</i>	6.21	5.84	0.37
10.	<i>Pad Parinah</i>	14.38	13.69	0.69

## DISCUSSION

When the actual mean obtained for each selected parameter was compared with the standard value stated by *acharya Charaka* in terms of *Anguli Pramana* a significant difference was found (Table-1). So, it can be considered that *Anguli Pramana* stated by *Acharya Charaka* for selected parameters may not be valid in the present era. Similarly, when the actual mean obtained for each selected parameter was compared with the standard value stated by *acharya Sushruta* in terms of *Anguli Pramana* a significant difference was

found (Table-2). So, it can be considered that *Anguli Pramana* stated by *Acharya Sushruta* for selected parameters may not be valid in the present era.

In ancient literature the measurement values are given in a single number. Those should be in the form of a range which will be better for understanding of normalcy. In the present study, interquartile range for the selected parameters was derived so as to get approximate range for the same (Table-3). Though these values are applicable for the selected sample size and selected parameters, it will serve as a basis for extending the research and future reference.

## CONCLUSION

Outcome of the present study reveal that the anthropometric values stated in ancient time are not valid in the present era. This may be due to evolutionary changes and changes in life style. The present study gives tentative information regarding the same. The research can be extended further to arrive at a proper conclusion.

## SCOPE FOR FURTHER RESEARCH

The research could further be carried out using larger sample size to arrive at generalization while narrowing the scope of age group. The study can be performed in various countries with diverse ethnicities.

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