

PRAMANA OF JANGHA AND ITS RELATION WITH THE HEIGHT OF HEALTHY INDIVIDUAL

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ABSTRACT

Pramana (Anthropometry) defines the concept of measurement of various biological entities. It bears an ample importance in medical applied science. *Jangha* (tibial length) is described vividly in various classics as the region between *Gulpha* (ankle joint) and *Janu Sandhi* (Knee joint). The average measurement is noted as eighteen *anguli* (finger breadth) in length and circumference is of sixteen *anguli* (finger breadth). Based on this regional description, it clearly demarcates the presence and importance of two long bones as tibia and fibula, which are responsible for individualizing the height of a person. Both the lengths of the bones are reciprocally related to the height of the person. In modern literature *Pramana Shareera* is described under the headings anthropology, anthropometry, and stature which are useful in assessing height, age, race, and nationality. In fact, *Pramana Shareera* in view of *Ayurveda* deals with *Ayu* (longevity), *Bala* (strength), *Ojas* (immunity), *Shareera* (body). In classics, the relationship between length of *Jangha* (tibial length) and height of the person is not vividly described, though this bears an ample of importance in various pathologies. Hence an effort is initiated to identify the *Pramana* of *Jangha* (tibial length) & its relation with the height of the healthy individual.

Keywords: *Jangha* (tibial length), *Pramana*, *Anguli* (finger breadth), Height & Anthropometry

INTRODUCTION

In *Ayurveda* the *Sharira* is given prime importance as one among those factors which contributes to *Ayu* of an individual. The other factors being *Indriya* (sense organs), *Satwa* (mind) and *Aatma* (soul)¹. This complete knowledge about *Sharira* at all times is very much essential for a physician in order to provide a healthy life for mankind. The essentiality of *Pramana* is depicted in the fundamentals of *Ayurveda* as, The *Mana/Pramana* of *Hitayu*, *Ahitaayu*, *Sukhayu*, and *Dukhayu* is the one which constitutes *Ayurveda*¹. *Ayurvedic* literatures per-

taining to *Shareera Rachana* furnish detailed description on measurements of body and its elements. In our classics *Pramana Shareera* is the term given to this subdivision which depicts the importance of measurement or anthropometry. *Pramana*, that other way defines the concept of measurement of various biological entities. It bears an ample importance in medical applied science.¹⁻² Before starting with the *chikitsa* which is considered as *karya* in the field of medicine, the wise physician should perform the *Pareeksha* of *Karyadesha* i.e. *Atura* (patient) *shareera*³. *Acharya Caraka*

explained *Dashavidha pareeksha vidhi* (10 modalities to examine a patient), and *Pramana pareeksha* is one among them. The basic goal behind *Pareeksha* is to get knowledge regarding the *Bala* of the *Rogi*^{4, 5}, where *Acharya Sushruta* considered it as the main tool to get the information regarding *Ayu* along with that of *Bala*. The *Sharira Pramana* is the only tool for determining the *Ayu* of an individual. The *Ayurvedic* classical literatures are documented along with many hypothetical concepts. The concept *Pramana* is also one among them which should be evaluated scientifically to bring out the hidden logical knowledge of *Ayurveda*. *Pramana* of a *Purusha* gives the detailed information regarding each body parts in terms of its external features. This can be helpful in understanding the anatomical knowledge required for the practice of *Ayurveda*. The modern anthropometry also has a similar kind of intentions in the field of medical science. Anthropometry (Greek anthropos - "man" and metron - "measure") refers to the measurement of the human individual. An early tool of physical anthropology, it has been used for identification, for the purposes of understanding human physical variation, in paleoanthropology and in various attempts to correlate physical with racial and psychological traits. Anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle, and adipose (fat) tissue. Today, anthropometry plays an important role in industrial design, clothing design, ergonomics and architecture where statistical data about the distribution of body dimensions in the population are used to optimize products. Changes in life styles, nutrition and ethnic composition of populations lead to changes in the distribution of body

dimensions (e.g. the obesity epidemic), and require regular updating of anthropometric data collections. Our Seers explained the concept of *Swa-Angula Pramana*. It can be ideal parameter irrespective of sex, race and place. The growth of the body varies in different ages and gets ceased after a particular stage, though the average measurement of the body is fixed by random study, the variation of measurement in growing age may take place.

In the classics *Anguli* (finger breadth) *pramana* of different parts of the body is categorically mentioned but their relation amongst each other has not been widely dealt with. *Jangha* (tibial length) is the term used for the part of body which is present in between the Knee and Ankle⁵⁻⁶. The relation between total body height and *Jangha* (tibial length) *Pramana* is not been found in any of the *Samhitas*. So here is a humble attempt made to find, is there any relation in terms of proportions between these two *Pramanas*. The concept of *Ayurveda*, i.e. measurements with individual parameter looks more scientific method rather than fixing on average basis. But the individual anthropometric points and criterion to measure are not mentioned in our classics, hence with the help of modern science an effort was made to put light on concept of *Pramana Shareera*.

AIMS & OBJECTIVES

- To evaluate the relation between *Pramana* of *Jangha* (tibial length), and the measurement of total body height statistically.
- To establish the *Pramana* of *Jangha* (tibial length) as told in classical *Ayurvedic* literature, scientifically.

- To justify the existing knowledge of *Pramana Shareera* by taking measurement of *Jangha* (tibial length) of different individuals.
- Determination of *Jangha* (tibial length), in terms of current concepts of Human Anatomy.

METHODOLOGY

One hundred healthy volunteers from and around the campus of Alva's *Ayurveda* Medical College, Moodbidri were selected and included in this present study.

Instruments

The following instruments were used to complete the present study.

- Measuring tape
- Measuring callipers
- Weighing machine

Inclusion criteria

- Healthy individuals from both sexes without any visible abnormalities ranging from 20-60 years of age.
- Individuals having BMI between 18.50 - 24.99 (Kg/m^2).

Exclusion criteria

Special care was considered to exclude the individuals who may impact on the result of study.

- Individuals with visible congenital and acquired lower limb deformities.
- Individuals with any known pathological conditions of the lower limb.

Assessment criteria

Anguli (finger breadth) *Pramana* (Anthropometry)

- Width of *madhyama parva* of *madhyama anguli* (finger breadth), (width of proximal inter-phalangeal joint of middle finger).

- Width of the palm at the level of metacarpophalangeal joints (2nd -5th) and dividing it by four.
- Length of the *madhyama anguli* (finger breadth) *i.e.* from tip of middle finger to metacarpo-phalangeal joint of middle finger which is then divided by five.

Pramana of Jangha:

Since there is no anatomical landmarks mentioned in Ayurvedic literatures, the Anthropometric techniques are personalized and two points are considered.

- Point A – Head of the Fibula.
- Point B – Outermost point over the Lateral surface of Lateral malleolus.

The distance between head of the fibula and the malleolus of fibula (lateral malleolus), was measured with the help of thread, and the circumference is taken at the mid-point of length obtained. The measured length is correlated with a standard measuring scale.

Measurement of *Jangha* (tibial length):

Prior to initiation of the study examination of the volunteers was carried out to ensure the normal stature and anatomical configuration lower limb. The middle finger is accepted as the tool of measurement. The middle finger is premeasured with callipers and converted into centimetre to arrive at uniform standardized result. Along with this, metacarpo-phalangeal joint is also considered as a tool of measurement of *Jangha* (tibial length). The measurement was carried out for length and circumference of the *Jangha* (tibial length), the data received recorded in the specific forms they are noted with age, sex, height, occupation, and education.

Measurement of Height of the individual⁵⁻⁶:

The height of the individual is measured by standing erect, facing forward, legs joined and heels touching the wall, where a standard scale is being kept. Then the scalp hairs are pressed with the help of a scale and the height is noted at that particular point and recorded. The other heights such as, while arms rose with standing on the toes facing the wall, is also recorded. The arm span is also noted for further reference.

The following points are noted during measuring procedure to enable accurate and minimal error free result and interpretation.

1. Clothing that might interfere with measurement procedure are removed and the volunteers were advised dressed in simple cloth.
2. Minimal compressions to the skin surface were taken care.
3. Profoma is prepared with observation of 100 healthy individuals for the present study.

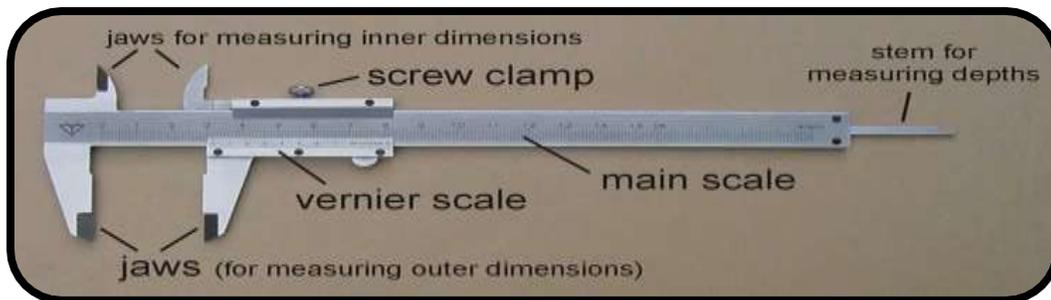


Fig 1- Vernier calipers

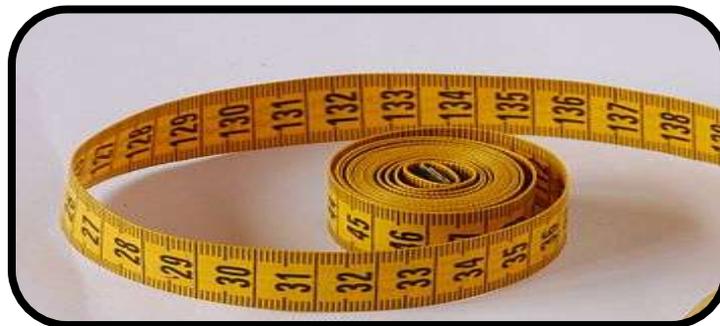


Fig 2: Measuring tape

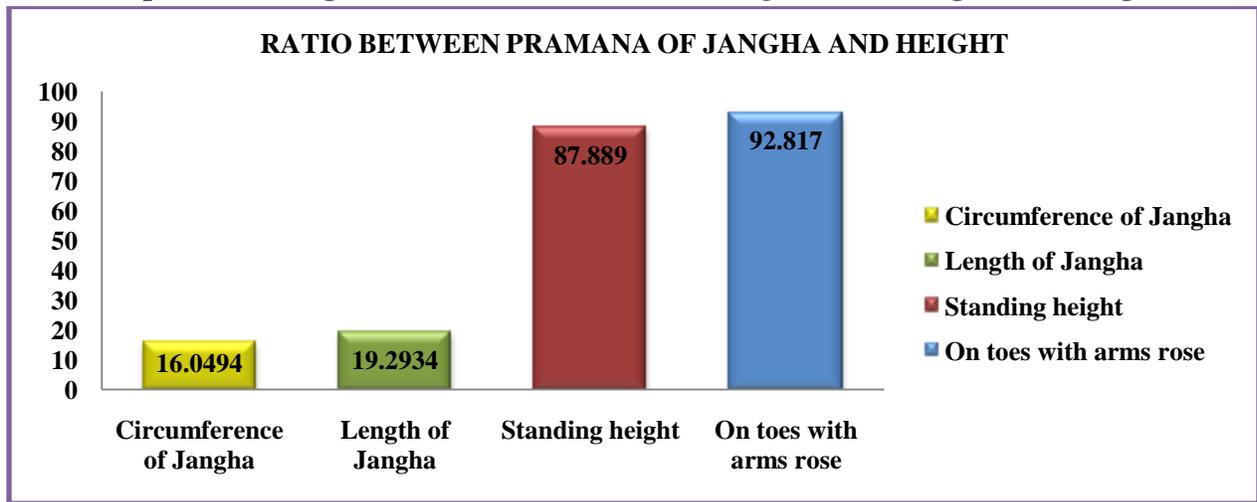


Fig 3: Measuring scale

Table 1: Showing Ratio between Pramana of Jangha (tibial length) and Height

Sr. No	Pramana	Mean values (in Anguli)
1.	Circumference of Jangha (tibial length)	16.0494
2.	Length of Jangha (tibial length)	19.2934
3.	Standing height	87.889
4.	On toes with arms rose	92.817

Graph 1: Showing Ratio between Pramana of Jangha (tibial length) and Height



In the present study it was observed that, the total standing height is 5.476 times the circumference of Jangha (tibial length) (Mean = 16.0494 Anguli (finger breadth)) and 4.555 times the length of Jangha (tibial length) (Mean = 19.2934 Anguli (finger breadth)). And the height measured by standing on toes and arms raised, is 5.627 times the circumference of Jangha (tibial length) (Mean = 16.0494 Anguli (finger breadth)) and 4.811 times the length of Jangha (tibial length) (Mean = 19.2934 Anguli (finger breadth)).

DISCUSSION

The study was conducted on 100 healthy volunteers in the age group of 20-60 years. As the ossification of both Tibia and Fibula completes at the age of 18th and 19th respectively in both the sexes. As the age progresses there is a slight decrease in the

stature, this is generally regarded to be approximately 6 mm per decade after the age of 30 yrs which is resulted from decrease in the elasticity & water content of intervertebral disc and decrease in muscle tone. There is tendency of the stature to reduce during the period of getting up to going to bed. This variation is due to diurnal variation in the water content of the intervertebral disc. Generally the reduction is 1.5-2 cm. But it may be up to 10 cm also if heavy loads are carried, usually seen in laborers. The height usually diminishes in the day time and increases in the morning after rest at night. So, all the measurements were taken in the morning.

Discussion on observation:

In the present study of 100 volunteers 80% were males and only 20% were females. Among them 56% belong to

21 – 30 years of age group, 17% belong to 31 – 40 years of age, 14% belong to 51 – 60 years of age and 13% belong to 41 – 50 years of age group. In the collected data, the circumference of right *Jangha* (tibial length) is found to be 12 to 22 *Anguli* (finger breadth) with a mean of 16.077 *Anguli* (finger breadth) and a standard deviation (SD) of 1.5877 *Anguli* (finger breadth).

The Pearson's correlation co-efficient (r) for the two variables was found to be (+) 0.338 showing Positive Correlation between the Circumference of Right *Jangha* (tibial length) and Height of the individuals statistically. The length of right *Jangha* (tibial length) was found to be 16 to 24 *Anguli* (finger breadth) with a mean of 19.294 *Anguli* (finger breadth) and a standard deviation (SD) of 1.0149 *Anguli* (finger breadth). Pearson's correlation co-efficient (r) for the two variables was found to be (+) 0.600 and showed a Positive Correlation between the Length of Right *Jangha* (tibial length) and Height of the individuals statistically.

The observed data says that, the circumference of left *Jangha* (tibial length) was found to be 12 to 22 *Anguli* (finger breadth) with a mean of 16.0213 *Anguli* (finger breadth) and a standard deviation (SD) of 1.7131 *Anguli* (finger breadth). Pearson's correlation co-efficient (r) for the two variables is found to be (+) 0.305. Statistically there was Positive Correlation between the Circumference of Left *Jangha* (tibial length) and Height of the individuals. The length of left *Jangha* (tibial length) is found to be 16 to 24 *Anguli* (finger breadth) with a mean of 19.292 *Anguli* (finger breadth) and a standard deviation (SD) of 0.9831 *Anguli* (finger breadth).

Pearson's correlation co-efficient (r) for the two variables is found to be (+) 0.620. Statistically there was Positive Correlation between the Length of Left *Jangha* (tibial length) and Height of the individuals.

The mean circumference of *Jangha* (tibial length) was found to be 12 to 22 *Anguli* (finger breadth) with a mean of 16.049 *Anguli* (finger breadth) and a standard deviation (SD) of 1.6367 *Anguli* (finger breadth). Pearson's correlation co-efficient (r) for the two variables is found to be (+) 0.324. There was Positive Correlation between the mean Circumference of *Jangha* (tibial length) and Height of the individuals statistically as per the study. In the current survey, the mean length of *Jangha* (tibial length) was found to be 16 to 24 *Anguli* (finger breadth) with a mean of 19.293 *Anguli* (finger breadth) and a standard deviation (SD) of 0.9768 *Anguli* (finger breadth). Pearson's correlation co-efficient (r) for the two variables is found to be (+) 0.624. There is Positive Correlation between the Mean Length of *Jangha* (tibial length) and Height of the individuals statistically as per the study.

CONCLUSION

Individualistic approach of *Pramana Shareera* helps to plan the treatment and decide the prognosis depending on the results of *Dashavidha Pareeksha*. Applicability of *Pramana Shareera* in the assessment of disease prognosis and mortality is true from centuries. The descriptions of specific anatomical landmarks for *Jangha* (tibial length) are not explained by *Ayurvedic* authors or commentators. With the available references in *Ayurvedic* and contemporary science the 'Head of the fibula which is palpable just below the knee, to the outermost projected part on the lateral malleolus'

was considered as *Jangha* (tibial length) in the present study. The present study gave a positive result in proving the relation of *Pramana* of *Jangha* (tibial length) & the height of the individual.

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