

## PILOT STUDY ON MEASUREMENT OF SHIRAS OF DEERGAYU AND MADHYAMAYU PERSONS

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### ABSTRACT

*Acharya Sushruta* has given the importance of *ayu* as a prerequisite before the commencement of treatment, the measurement of various *angas* and *pratyangas* are given in *anguli praman*. Among the *shadangas* the *shiras* is considered to be the most important part. A pilot study was conducted on 6 volunteers from Group A i.e. *deergayu* persons and six cadavers from Group B i.e. *Madhyamayu* persons. The selected three measurements of *shiras* given by *Sushruta* was measured in both the groups, among the three selected measurements one measurement was found to be statistically significant and hence can be considered as practically important and can be applied after detailed study on a larger data.

**Keywords:** *anguli praman, deergayu, madhyamayu*

### INTRODUCTION

In *Sushruta sutrastana* 35<sup>th</sup> chapter i.e. *Aaturopakramaneeya adhyaya*, *Acharya Sushruta* has mentioned about *anguli praman*. In this chapter *Acharya* has described that a physician should observe the *ayu* of the patient before commencing the treatment, after that *vyadhi, agni, vaya, dehabala, satva, satmya, prakruti, bhashaja, desa*, etc. should be observed and carefully examine<sup>[1]</sup>. He has given the measurement of more than 50 *anga pratyanga*, all the measurement are in *swanguli pramana*<sup>[5]</sup>. He has mentioned that a person with *yukta pramana* i.e. appropriate *pramana* will have *deergayu* and *vitta*, a person with *madhyama pramana* will have *madhyamayu* and *vitta* and a person with *avara pramana* will have *heenayu* and *vitta*, which is said as below

“Dehah swarangulairaisa yathavatanukeertitah |  
Yuktah pramanena puman yadi vaangana ||  
Deergamayuravapnoti vittam ca mahadrichati |  
Madhyamammadhyamaryaurvittam  
heenaistathaavaram |”<sup>[6]</sup>

**Aim:** compare the measurement of *shiras* between *deergayu* and *madhyamayu* persons.

**Objective:**

1. To understand the concepts of *Ayurveda* related to *deergayu* and *madhyamayu*.
2. To find if there is any difference in the measurement of *shiras* among *deergayu* and *madhyamayu* persons.

**Materials**

1. Review from *ayurveda*, modern literature and previous work done.

2. Flexible measuring tape
3. Six volunteers from group A i.e. *deergayu* persons
4. Six cadavers from group B i.e. *madhyamayu* persons

**Inclusion criteria**

- a. Head measurements from group A i.e. *deergayu* persons and from group B i.e. *madhyamayu* persons
- b. Sex - male
- c. Age - group A – above 85 yrs., group B – 35 to 55 yrs.

**Exclusion criteria**

- a) With congenital and acquired deformity of head.
- b) Age - group A - below 85yrs, group B -below 35yrs. & above 55yrs.

**Method**

- a) Formation of two groups
- b) Measurement of one *swanguli* in cm.
- c) Measurement of selected *pratyanga* in cm.
- d) Comparison of the difference in TDM & PMM of both groups

**a) Formation of two groups**

Formation of group A

To assess the measurement of *deergayu* person this group was formed. According to *Sushruta’s* classification of age above 70 is considered to be *vridha avastha*<sup>[7]</sup>, also by definition of lifespan of *deergayu*, the person between the age group of 70 yrs to 100 yrs is considered as *deergayushi*.to avoid error or bias in calculating age ,difference of +15 was added and therefore person above 85 yrs were considered as *deergayu*.

**Formation of group B**

To assess the measurement of *madhyamayu* person this group was formed. According to *Sushruta’s* classification of age, age group between 16yrs to 70yrs is considered to be *madhyama vaya*<sup>[7]</sup>, one can label the person as *madhyamayushi* if his death has occurred in *madhyama vaya*, therefore cadavers were selected for this purpose. To avoid error or bias in calculating age, difference of -15 was reduced and therefore person below 55 yrs and above 35 yrs were considered as *madhyamayu*.

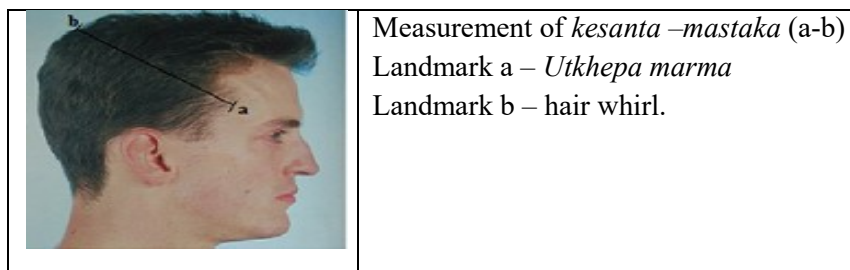
**b) Measurement of 1 *swanguli* in cm.**

After formation of two groups, measurement of one *swanguli* in cm. was decided to be considered. For this previous work of Dr. Pooja Chauhan “Critical study of measurement methods of *brihatrayee* to measure human height” was referred. From her work the formula to calculate 1 *swanguli* in cm. was obtained. i.e.  $N / 84 = 1 \text{ swanguli praman}$  in cm. (N = height in cm of a particular person).

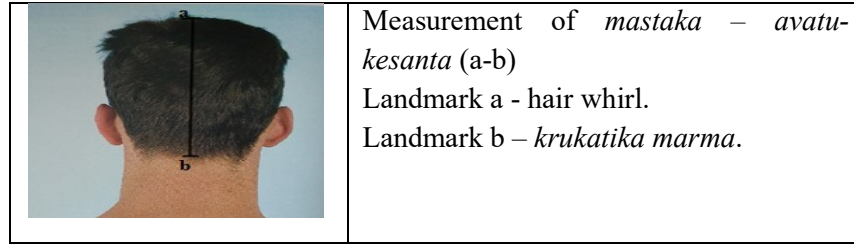
**c) Measurement of selected *pratyanga* in cm.**

After obtaining 1 *swanguli praman* of that person, measurement of selected *pratyanga* was done in cm. using flexible measuring tape and records as Practically Measured Measurement (PMM) .To calculate TDM the one *swanguli praman* of that person was multiplied with the standard *anguli praman* of the particular *pratyanga* , thereby obtaining theoretically derived measurement (TDM) in cm. The 3 *pratyangas* selected from the head region are as follows

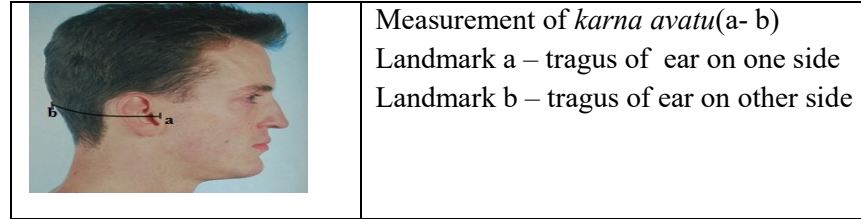
**Photograph 1:** showing measurement site of *kesanta –mastaka*



**Photograph no: 2** showing measurement site of *mastaka –avatu- kesanta*



**Photograph no: 3** showing measurement site for *karna avatu*



**d) Comparison of the difference in TDM & PMM of both groups**

The TDM and PMM difference of both the groups was compared; the less difference indicates that the

measurement is nearer to the standard measurement of *Sushruta*.

Observation

**Table 1:** observation of the difference in TDM and PMM of selected measurements in Group A

SL.NO	Ht.(cm)	HEAD MEASUREMENT(Group A) in cm.		
		1.	2.	3.
		TDM-PMM	TDM-PMM	TDM-PMM
1	158	1.76	1.3	0.92
2	150	1.9	1.5	0.57
3	160	1.85	1.8	0.63
4	154	1.5	1.6	0.5
5	157	1.65	1.9	0.85
6	148	1.89	1.57	0.39

**Table 2:** observation of the difference in TDM and PMM of selected measurements in Group B

SL.NO	Ht.(cm)	HEAD MEASUREMENT (Group B) in cm.		
		1.	2.	3.
		TDM-PMM	TDM-PMM	TDM-PMM
1	158	0.98	1.24	1.5
2	150	1.23	1.43	1.23
3	160	1.33	1.67	1.55
4	154	0.88	1.8	1
5	157	1.35	1.56	1.22
6	148	1.99	1.32	1.67

**Statistical analysis:** Statistical analysis of two groups were done as follows

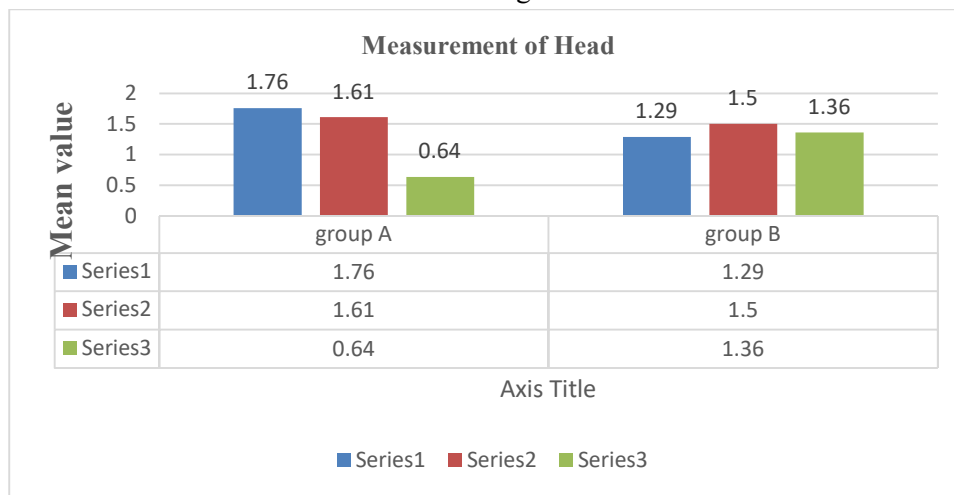
- A. Table form
- B. Diagram form- Bar Diagram

A. Table form

**Table 3:** statistical values

Head measurement	Mean	N	SD	T value	P value
1.kesanta mastaka	1.76	6	0.02	2.7	0.02
	1.29	6	0.15		
2.mastaka avatu kesanta	1.61	6	0.05	0.88	0.40
	1.50	6	0.05		
3.karna avatu	0.64	6	0.04	-5.42	0.0002
	1.36	6	0.06		

B. Bar diagram



1. *Kesanta – Mastaka* mean value of Group A is 1.76cm and of Group B is 1.29cm. Using two sample T test, P Value was  $0 < 0.02$ , therefore statistically significant.
2. *Mastaka – Avatu Kesanta* mean value of Group A is 1.61cm. and of group B is 1.50cm. , Using two sample T test, P value was  $0.2 < 0.40$ , therefore not statistically significant.
3. *Mastaka- Avatu Kesanta* mean value of Group A is 0.64cm. and of group B is 1.36cm. , using two sample T test, P value was  $0 < 0.0002$ , therefore statistically significant.

Out of the above three measurements only *Mastaka – Avatu Kesanta* was found to be not significant and the other two measurements were significant.

**DISCUSSION**

Discussion regarding selection of 3 measurements of head

*Sushruta* has mentioned 16 facial measurements and 3 cranial vault measurements. The supremacy of man in animal kingdom is due to his well-developed brain which provides him the unlimited power of thinking, reasoning and judgement. To accommodate large brain, the size of the cranium also increased proportionately [8]. Head measurements are related to flat bones i.e. cranial vault. Hence the three cranial vault measurements indicating the development of brain were selected for the study. Therefore *shiras* is considered to be most important.

## CONCLUSION

Difference in all the three measurements was observed between the group A and group B. Specific difference observed among the three measurement of *shiras* was in *karna avatu* measurement. Here the difference is less in *deergayu* than in *madhyamayu* i.e. the measurements of *dheergayu* persons are close to the standard measurement given by *Sushruta*, which can be considered to be significant in assessment of *ayu*. By prima facie it can be considered as a tool for assessment of *ayu* but requires further research in this line with a larger data.

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