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A comparative analysis of *Parimana* (measurements) mentioned in *Hastyayurveda* with *Charak Samhita* and *Sharangdhar Samhita*

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ABSTRACT

The *Hastyayurveda*, authored by sage Palkapya is one of the most important ancient text available having description of wellbeing, diseases and their management in elephants. The text has been composed in the form of conversation between king of *Anga Desha*, *Romapada* and sage Palkapya. The text *Hastyayurveda* is the unexplored part of *Ayurvedic* literature. There is a need to explore the text and understand the fundamental principles, theories and traditional healing system by comparing it with the well-established available *Ayurvedic* literature. This endeavour will not only enrich our understanding but also serve as a crucial step in preserving ancient wisdom. It is an established and well accepted fact that *Parimana* (Measurements) have crucial importance in therapeutics, in both human beings as well as in animals. Like *Charak Samhita* and *Sharangdhar Samhita*, *Hastyayurveda* also contains description of *Parimana*. As we know, *Charak Samhita* is most widely accepted *Samhita* text in *Ayurveda* and *Sharangdhar Samhita* is considered as the basic text dealing with *Bhaishajya Kalpana*. Present paper is an effort towards a comparative analysis of different types of *Parimana* described in *Hastyayurveda* with those described in *Charak Samhita* and *Sharangdhar Samhita*.

Key words: *Charak Samhita*, *Hastyayurveda*, Measurements, *Parimana*, *Sharangdhar Samhita*.

INTRODUCTION

In the historical annals of India, the inception of traditional veterinary medicine traces back to the epoch of the *Mahabharata* i.e., 5000 B.C., as meticulously documented in the form of *Nakula Samhita*, *Asvayurveda*, *Gavayurveda*, *Hastyayurveda*,

Gaja Sastra, *Asva Sastra*, *Matanglila*, *Asva Vaidyaka*, *Mrgpada Sastra* are some of the ancient *Ayurvedic* texts which deals with diseases affecting different species and provide insightful treatments. There are some texts available concerned with the conservation and management of plant health also such as *Vrikshayurveda*. Some of these texts are not available in present and some are present in the form of manuscripts. It is our obligation to scrutinize the ancient texts in order to determine their period, unravel the underlying principles and illuminate the traditional methodologies employed in the therapeutic care of living beings.

In *Agnipurana*, sage Palkapya is quoted as exponent of 'Science of Animal'.^[1] The book wrote by Palkapya i.e., *Hastyayurveda* is one of the rare, oldest and complete *Samhita* text which is exclusively a treatise on elephants. In this *Samhita*, there is complete explanation of *Sharir Rachana* (anatomy), *Sharir Kriya*

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(physiology), *Rog Vigyana* (pathology), *Shalya Chikitsa* (surgery) and treatment of elephants. Signs and symptoms of disease, indications of imminent demise of elephants are also described in this text.

Time Period and Authorship^[2,3]

Expounder of *Hastyayurveda* is sage Palakapya.

The time period of *Hastyayurveda*, as inferred from the mention of sage Palkapya in the *Agnipurana*, is suggested to span from 200 BC to 500 A.D. It has also been proclaimed that there is mention of King Rompada in *Balakand* of *Ramayana*. On the basis of this fact, sage Palkapya and text *Hastyayurveda* should be placed to the period of King Dasharatha (*Ramayana Kala*) but according to historians, the time period of the text *Hastyayurveda* has been considered as 11th century AD.

Texts Expounded by Sage Palkapya are^[2]

- *Hastyayurveda*
- *Gajasastra*

Hastyayurveda has been published by Anandashram press in 1894. The book is based on the edited version of four manuscripts available from different sources. Editing of the manuscripts was done by Pandit Shiva Datta Sharma, who was native and teacher at Jaipur Sanskrit School and later an eminent teacher at Sanskrit School, Lahore. Text published by Anandashram was edited using following four manuscripts -

- One was from Sri Krishna Sharma from his own collections.
- Two from library of Pune and Kolkata.
- Personal collection of a Sikar based Vaidya Goswami Anandilal.^[3]

Structure of *Hastyayurveda*^[1]

Like other *Samhita* texts, the text *Hastyayurveda* is in the form of conversation between the King of Anga, Romapada and sage Palkapya.

The text consists of -

- a) 4 *Sthanas*

- b) 160 *Adhyayas*

- c) 12000 *Shlokas*

Sthanas and *Adhyayas* mentioned in texts are -

1. *Maha Roga Sthana* - 18 *Adhyay*
2. *Kshudra Roga Sthana* - 72 *Adhyay*
3. *Shalya Roga Sthana* - 34 *Adhyay*
4. *Uttar Roga Sthana* - 36 *Adhyay*

Parimana (Measurements)

The term *Parimana* in the context of measurement and quantity is indeed a concept found in ancient Bharatiya texts, particularly in literature related to various sciences, including Mathematics, Astronomy and *Ayurveda*. It's important to note that *Parimana* is a *Sanskrit* word that has been used in ancient Bharatiya literature to denote different measurements. In *Ayurveda*, the term *Parimana* refers to the quantity or appropriate measure of a substance. It holds significance in *Ayurveda* in the management of diseases and well-being. Proper quantity or *Parimana* of various substances such as medicines, herbs and food is advised to maintain good health and to aid in the treatment of illnesses. *Ayurvedic* principles have been applied to animal nutrition also. Just as humans have *Dosha* imbalances, animals may have their own imbalances. Accurate measurement of food and herbs plays a crucial role in preserving or restoring equilibrium within the bodies of animals.

Ayurveda dealing with the treatment of animals is referred to as *Gavayurveda*. Another specific branch of *Ayurveda* dealing with the conservation of health, diseases and their treatment in elephants has been referred to as *Hastyayurveda*. In order to have insights of different aspects of health, diseases and their management in elephants in ancient Bharat, a study was planned and is being executed on the text *Hastyayurveda* of Palkapya. In this context, it is evident that quantity of drugs used for the treatment of diseases in elephants will always be higher as compared to dosage used in human beings. In *Hastyayurveda* chapter 2 of *Pratham Khand* (section 1) *Maharogasthanam* viz. *Annasamachar Adhyaya*, there

is detailed description of various factors pertaining to elephants including types of elephants on the basis of their height and age, aetiology of diseases, *Parimana* in context of defining dosage to be used for the treatment of disease in elephants.

In both *Sharangdhar Samhita* and *Hastyayurveda*, the definition of 'Paramanu' is same i.e., the subtle dust that appears in the light within the mesh is called 'Raja'. The thirtieth part of 'Raja' is called as *Paramanu*.^[4,5] There is no clear mention of *Payyaman* (measurement of length) in *Ayurveda*, but words like *Angul*, *Vitasti*, *Aratni*, *Vyam* etc. are mentioned at many places, which are described in *Lilavati*, *Kautilya Arthashastra*, *Amarkosha*. The smallest unit in this is considered to be *Angula* i.e. width of a finger.^[6] The term *Payyaman* is not there in text *Hastyayurveda* but there is description of measurement of length which we have discussed about in this article.

Pramana (measurements) have an important role especially in defining various aspects related to diet and drug. Therefore, a comparative analysis of different types of measurements described in *Hastyayurveda*, *Charak Samhita* and *Sharangdhar Samhita* is being done in present article.

Comparison of measurements of weight described in *Hastyayurveda* with these in *Charak Samhita* and *Sharangdhar Samhita* (Table No. 1)

- Smallest unit of measurement mentioned in *Hastyayurveda* is *Paramanu* which is similar as mentioned in *Magadha mana* of *Sharangdhar Samhita*. *Acharya Charaka* considers smallest unit of *Magadha Mana* as 'Dhvanshi'.
- Sachulika Phal* and *Kakini* are the *Manas* which are mentioned in *Hastyayurveda* and are not explained in *Charak Samhita* and *Sharangdhar Samhita*.
- According to *Charak* and *Sharangdhar*, 4 *Yava* is equal to 1 *Andika* and 1 *Gunja* respectively and according to *Hastyayurveda*, 4 *Yava* is equal to 1 *Kakini*. From this we can conclude that *Kakini* is of same value of *Andika* and *Gunja*.

- According to *Charak* and *Sharangdhar*, 2 *Kudav* equals to 1 *Manika* but according to *Hastyayurveda*, 4 *Drona* equals to 1 *Manika*.
- According to *Charak*, 32 *Prastha* i.e., 4 *Kansa* equals to 1 *Drona* whereas according to *Sharangdhar* and *Hastyayurveda* 4 *Aadhak* i.e., 16 *Prastha* is equals to 1 *Drona*.

Table 1: Comparison of Measurement of Weight

<i>Hastyayurveda</i> ^[5]		<i>Charak Samhita</i> ^[7]		<i>Sharangdhar Samhita</i> ^[4]	
8 <i>Sachulika phala</i>	1 <i>Sarshapa</i>	6 <i>Marichi</i>	1 <i>Rakta Sarshapa</i>	6 <i>Marichi</i>	1 <i>Rajika</i>
				3 <i>Rajika</i>	1 <i>Sarshapa</i>
8 <i>Sarshapa</i>	1 <i>Yava</i>	8 <i>Rakta Sarshapa</i>	1 <i>Tandula</i>	8 <i>Sarshapa</i>	1 <i>Yava</i>
		2 <i>Tandula</i>	1 <i>Dhanya-masha</i>		
		2 <i>Dhanya-masha</i>	1 <i>Yava</i>		
4 <i>Yava</i>	1 <i>Kakini</i>	4 <i>Yava</i>	1 <i>Andika</i>	4 <i>Yava</i>	1 <i>Gunja / Ratti / Rakti</i>
4 <i>Kakini</i>	1 <i>Masha</i>	4 <i>Andika</i>	1 <i>Mashaka/ Hema/ Dhanyaka</i>	6 <i>Gunja</i>	1 <i>Masha / Rajmasha / Hem / Dhanyak</i>
4 <i>Masha</i>	1 <i>Shana</i>	3 <i>Mashaka</i>	1 <i>Shana</i>	4 <i>Masha</i>	1 <i>Shana/Tank / Dharan</i>
4 <i>Shana</i>	1 <i>Suvarna</i>	2 <i>Shana</i>	1 <i>Drankshana / Kola / Badara</i>	2 <i>Shana</i>	1 <i>Kola / Kshudrak/ Vataka / Drakshana</i>
		2 <i>Drankshana</i>	1 <i>Karsha/ Suvarna/ Aksha/ Bidalpada k/ Pichu/ Panital/</i>	2 <i>Kola</i>	1 <i>Karsha/Pani-manika / Aksha / Aksha pichu /</i>

			Tinduk / Kavalgraha		Panitala/Kitpani/Tinduka/ Vidal padaka / Shodashika /Karmadhy/Hans pada / Suvarna
4 Suvarna	1 Pala	2 Suvarna	1 Palardha/ Shukti/Ashtamika	2 Karsha	1 Shukti/ Ashtmika/ Ashtamansha
		2 Palardha	1 Pal/Mushti / Prakunch / Chaturthika/Bilva/S hodas - hika/ Aamra	2 Shukti	1 Pala / Amra/ Mushti/Chatur-thika/ Prakun-cha / Shodashi /Bilva
4 Pala	1 Kudava	2 Pala	1 Prasrut/ Ashtamana	2 Pala	1 Prasruta / Ardhanjali
		4 Pala	1 Anjali/ Kudava	2 Prasrata	1 Kudava / Anjali / Ardha saravak/Ashta mana/ Ashtashukti
4 Kudava	1 Prastha	2 Kudava	1 Manika	2 Kudava	1 Manika /Sarava
		4 Kudava	1 Prastha	2 Manika	1 Prastha
4 Prastha	1 Aadhaka	4 Prastha	1 Aadhaka	4 Prastha	1 Aadhaka/ Bhanjan/ Kanspatra
4 Aadhaka	1 Drona	4 Kansa	1 Drona / Armana/ Nalvana/ Kalasha/ Ghata/Unman	4 Aadhaka	1 Drona/ Kalansh/Nalvana/ Unmana/ Ghata / Rashi

4 Drona	1 Manika	-	-	-	-
4 Manika	1 Khari	2 Shurpa	1 Goni/ Khari/Bhara	4 Droni	1 Khari
100 Pala	1 Tula	100 Pala	1 Tula	100 Pala	1 Tula
-	-	-	-	30 Parmanu	1 Vanshi
-	-	6 Dhvanshi	1 Marichi	6 Vanshi	1 Marichi
-	-	8 Prastha	1 Kansa	-	-
-	-	2 Ghata	1 Shurpa/ Kumbha	-	-
-	-	32 Shurpa	1 Vaha	-	-
-	-	-	-	2 Drona	1 Shurpa/ Kumbha
-	-	-	-	2 Shurpa	1 Droni/ Vahi/ Goni
-	-	-	-	2000 Pala (20 Tula)	1 Bhara

Comparison of Measurements of Weight described in Hastayurveda with Metric System

A comparative presentation of measurements of weight described in *Hastayurveda* is being done with presently accepted metric system (Table No. 2).

Table 2: Comparison of measurements of Weight with Metric System

Hastayurveda ^[5]		A.P.I. ^[8] (Metric Equivalents)
8 Sachulika Phala	1 Sarshapa	1.95 mg
8 Sarshapa	1 Yava	62.5 mg
4 Yava	1 Kakini	125mg

4 <i>Kakini</i>	1 <i>Masha</i>	1 g
4 <i>Masha</i>	1 <i>Shana</i>	4 g
4 <i>Shana</i>	1 <i>Suvarna</i>	12 g
4 <i>Suvarna</i>	1 <i>Pala</i>	48 g
4 <i>Pala</i>	1 <i>Kudava</i>	192 g
4 <i>Kudava</i>	1 <i>Prastha</i>	768 g
4 <i>Prastha</i>	1 <i>Aadhaka</i>	3 kg 73 g
4 <i>Aadhaka</i>	1 <i>Drona</i>	12 kg 228 g
4 <i>Drona</i>	1 <i>Manika</i>	-
4 <i>Manika</i>	1 <i>Khari</i>	-
100 <i>Pal</i>	1 <i>Tula</i>	4 Kg 800 g

Comparison of measurement of Length described in *Hastyayurveda* with metric system (Table no. 3).

In ancient texts, the linear measurements are ruled by body parts i.e., width of finger, length of forearm etc. and distance by number of steps. But today, there are many measuring parameters are available by which we can easily calculate the length. In *Hastyayurveda*, there is detailed description of linear measurements. Comparative presentation of linear measurements described in *Hastyayurveda* is being done with presently available metric system.

Table 3: Comparison of Measurements of Length with Metric System

<i>Hastyayurveda</i> ^[5]		Metric Equivalents
1 <i>Parmanu</i>	1/30 <i>Raja</i>	-
8 <i>Paramanu</i>	1 <i>Trasarenu</i>	0.00079mm
8 <i>Trasarenu</i>	1 <i>Ratharenu</i>	0.0063mm
8 <i>Ratharenu</i>	1 <i>Valagra</i>	0.05mm
8 <i>Valagra</i>	1 <i>Liksha</i>	0.41mm
8 <i>Liksha</i>	1 <i>Yuka</i>	3.25mm
8 <i>Yuka</i>	1 <i>Yava</i>	26 mm ^[9]

8 <i>Yava</i>	1 <i>Angula</i>	1.95 cm ^[8]
6 <i>Angula</i>	¼ <i>Aratni</i>	10.47 cm
24 <i>Angula</i>	1 <i>Aratni</i>	41.91 cm ^[10]
12 <i>Angula</i>	1 <i>Vitasti</i>	22.86 cm ^[10]
2 <i>Vitasti</i>	1 <i>Kishku</i>	45.72cm
2 <i>Kishku</i>	1 <i>Dhanu</i>	3-4m ^[11]
1000 <i>Dhanu</i>	1 <i>Kroscha</i>	3 km ^[12]
2 <i>Kroscha</i>	1 <i>Gavyuti</i>	3.65 km ^[13]
4 <i>Gavyuti</i>	1 <i>Yojan</i>	12.8 km ^[14]

Some References of Utilization of *Parimana* in text *Hastyayurveda*^[5]

- To increase the digestive fire - *Gud* (jaggery) mixed with *Tandula* (Rice) - start the dose from *Pala* and gradually increase upto *Kudava*, then increase the amount of jaggery and rice to two times, three times and four times.
- In text *Hastyayurveda*, there is reference of amount of diet w.r.t. size of elephant.^[10] (Table no 4). In considering that human beings necessitate an appropriate amount of meals tailored to their individual height and weight, animals also require a specific amount of meal for their healthy life. The amount of food also varies with appetite.

Table 4: Amount of diet of elephant w.r.t. their size.

Measurement of elephant in <i>Aratni</i> (Height X Length X Circumference)	Amount of meal
7 X 9 X 10	7 <i>Drona</i>
6 X 8 X 9	6 <i>Drona</i>
5 X 7 X 8	5 <i>Drona</i>
4 X 6 X 7	4 <i>Drona</i>
3 or 2 <i>Aratni</i> height	3 or 2 <i>Drona</i>
The amount of meal (in <i>Drona</i>) is same as height of the elephant (in <i>Aratni</i>).	

3. Quantity of different *Rasa* in diet of elephant.-
 - *Madhura, Lavana, Amla* and *Kashaya Rasa* in 2 *Palika/ Aratni* amount.
 - *Katu Rasa* in 1 *Karsha* amount.
 - *Tikta Rasa* in 2 *Karsha* amount.
4. Amount of *Rasa* in elephants for healthy life.
 - *Madhura* - 6 *Pala*
 - *Tikta* - ½ of *Madhura* i.e., 3 *Pala*
 - *Katu* - ½ of *Tikta* i.e., 1.5 *Pala*
 - *Kashaya* - 1/6 of *Katu* i.e., 0.25 *Pala*
 - *Lavana* and *Amla* - 1/6 of *Kashaya* i.e., 0.04 *Pala*.
5. The strength of elephant on the basis of distance covered by them is mentioned in the text which shows the reference of *Payyamana* in *Hastyayurveda*. (Table no.5)

Table 5: Distance covered by elephant according to their strength.

Strength	Male Elephant	Female Elephant
Superior	10 <i>Yojana</i>	7 <i>Yojana</i>
Medium	7 <i>Yojana</i>	5 <i>Yojana</i>
Inferior	5 <i>Yojana</i>	4 <i>Yojana</i>

CONCLUSION

Hastyayurveda written by sage Palkapya is one of the oldest and available text dealing with diseases and their treatment in elephants. Some scholars consider it to be placed in *Ramayana Kaal*, while some date it back to *Purana Kaal* and some historians date it to 11th century AD. There is detailed description of measurement of weight and measurement of length in *Hastyayurveda*. A comparative analysis of these measurements with those described in *Charak Samhita* and *Sharangdhar Samhita* reveals that the fundamental concepts and the majority of measurement units are similar across all three texts. There is slight difference in the smallest unit of

measurement being '*Paramanu*' in *Hastyayurveda* and *Sharangdhar Samhita* as compared to *Dhvanshi* in *Charak Samhita*. *Sachulika phal* has been considered as smallest unit of weight in *Hastyayurveda* in place of *Marichi* of *Charak Samhita* and *Sharangdhar Samhita*. Thus, in spite of differences in the units of measurements the basic concept of measurements appears to be same in all the three texts.

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