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Assessment of relation between *Dhatusarata* and *Dehabala* w.s.r. to Harvard Step Test

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ABSTRACT

The growth and existence of the human body is dependent on these seven *Dhatus*. These seven *Dhatus* are composed of five elements or *Panchmahabhutas*. *Dhatu Sarata* or Tissue excellence is a quality assessment of seven *Dhatu*. Examination of *Dhatu Sarata* is done at physical and psychological level. For determining the *Dhatu Sarata*, when the positive features are present above 75 %, it will be considered as best tissue quality (*Uttam Sarata*). When the positive features are present between 75 % and 25 %, it will be considered as moderate tissue quality (*Madhyam Sarata*). When positive features are present below 25 %, it will be labeled as poor tissue quality (*Heen Sarata*). The bodily movements which are meant for producing firmness and strength in the body are known as *Vyayama* or physical exercises. '*Dehabala*' (Physical fitness) of subjects will be determined by Harvard step test. "Harvard Step Test" is a practical application of Ayurvedic Principal that "*Bala* should be measured by *Vyamshakti*" (*Balam Vyayamshakty Parikshet*). The person should be examined with reference to his capacity for exercise which is determined by one's ability to perform work. Therefore this study will estimate *Dehabala* and study the *Dhatusarata* and their association between them.

Key words: *Dhatusarata*, *Dehabala*, Tissue excellence, Harvard Step Test.

INTRODUCTION

Sushruta says the supreme essence of all the *Dhatus* beginning with *Rasa* and ending with *Shukra* is known as *Ojas* and the same is also called *Bala* (strengthen). And strength is not depending only on physical build up but it depends on the *Sara* means the excellence quality of *Dhatu*. In the text, this *Dhatusarata* is described with respect to *Sapta Dhatu*; viz. *Rasa* (skin), *Rakta* (Blood), *Mamsa* (muscle tissue), *Medas*

(adipose tissue), *Asthi* (bone tissue), *Majja* (marrow), *Shukra* (semen) and *Sattva* (mind) i.e. *Ashtavidhsarata*. *Dhatu Sarata* or Tissue excellence is a quality assessment of seven *Dhatu*. Examination of *Dhatu Sarata* is done at physical and psychological level. The bodily movements which are meant for producing firmness and strength in the body are known as *Vyayama* or physical exercises. The person should be examined with reference to his capacity for exercise which is determined by one's ability to perform work. Therefore this study will estimate *Bala* in the subjects and study the *Dhatusarata* and their association between them.

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AIM

To study the *Dhatu Sarata* (Tissue quality) with the subjective parameters mentioned in the text in Subjects

OBJECTIVES

- To assess relation between *Dhatu Sarata* (Tissue quality) and *Dehabala* (physical strength).

- To study the *Dehabala* (Physical fitness) by using "Harvard Step Test" in Subjects.

MATERIALS AND METHODS

This assessment study was conducted among 50 healthy subjects (volunteers) between 20 to 35 year age group selected for the study. This study was conducted at Shrushti Clinic & Hospital, Shahapur for six month duration. Subjects were interviewed by pre designed questionnaire that contains the information about *Dhatu Sarata* (Tissue Quality) and *Bala Parikshan* examination was done by Harvard step test. The allied required information of the volunteers were collected like diet (Veg / Non veg), exercise etc.

Assessment Criteria

When the positive features recommended by *Acharaya Charak* are present above 75 %, it will be considered as best tissue quality (*Uttam Sarata*). When the positive features are present between 75% and 25%, it will be considered as moderate tissue quality (*Madhyam Sarata*). When positive features are present below 25%, it will be labeled as poor tissue quality (*Heen Sarata*).

Harvard step test

Dehabala or physical fitness of each subject was determined by Harvard step test. "Harvard Step Test" is a Practical application of *Ayurvedic* Principal that "*Bala* should be measured by *Vyamshakti*" (*Balam Vyayamshakty Parikshet*). The subject steps up and down on the bench of having height 20 inches (For male) and 18 inches (For Females). Stepping at rate of 30 steps / min will be performed for period of 5 minutes (Males) or 4 minutes (females) or until exhaustion. Physical efficiency Index was calculated with the following Formula.

PEI = Duration of exercise in seconds X 100

2 X (A+B+C)

Where, A = Pulse of 1 to 1.5 minutes during recovery.

B = Pulse of 2 to 2.5 minutes during recovery.

C = Pulse of 3 to 3.5 minutes during recovery

Classification of Fitness according to index:

Physical efficiency index	Fitness
Below 55	Poor
55-64	Low average
65-79	Average
80-89	Good
90 and above	Excellent

RESULTS

For determining *Dhatusarata* and *Dehabala* total 50 subjects of age between 20 to 35 years were assessed. *Dhatusarata* (Tissue Quality) was found as per positive features recommended by *Acharaya Charak* (Table 1). *Uttam Sarata* was found in 13 (26%) Subjects, *Madhyam Sarata* was found in 25 (50%) subjects and *Heen Sarata* was found in 12 (24%) subjects.

Table 1: Sex wise distribution of subjects according to Dhatusarata.

Dhatusarata	Male	Female	Total
<i>Uttam Sarata</i>	7	6	13
<i>Madhyam Sarata</i>	13	12	25
<i>Heen Sarata</i>	6	6	12
Total	26	24	50

Table 2: Classification of physical fitness as per physical efficiency index.

PEI	Male	Female	Total
Excellent	9	7	16
Good	7	5	12
Average	5	3	8
Low average	2	4	6

Poor	3	5	8
Total	26	24	50

Table 2 shows physical efficiency index of all the subjects. Most of the subjects i.e. 56 % were excellent & good physical efficiency index. Whereas 44% of subjects having average, low average & poor physical efficiency index.

Table 3: Association between Dhatusarata and physical efficiency index.

PEI	Dhatusarata			Total
	Uttam Sarata	Madhyam Sarata	Heen Sarata	
Excellent	6	0	0	6
Good	7	0	0	7
Average	0	13	0	13
Low average	0	12	0	12
Poor	0	0	12	12
Total	13	25	12	50

It has been observed that those subjects having *Uttam Sarata* (13) were excellent with good physical efficiency index, while subjects having *Madhyam Sarata* (25) were average with low average physical efficiency index. Subjects having *Heen Sarata* (12) were poor physical efficiency index (Table 3). No significant difference was found among Male and female subjects. There is association between *Dhatu Sarata* and physical fitness (P value is less than 0.05).

DISCUSSION

Dehabala or Physical Aerobic fitness by 'Harvard Step Test' has also significant correlation with *Rasa*, *Asthi*, *Majja* and to some extent with *Shukra*, *Mansa Sarata*. 'Harvard Step Test' is very good, universally accepted 'Objective parameter' to access 'Yuktija and Kalaja Bala' i.e. fitness acquired through practice of exercise,

proper diet and healthy season etc. 'Harvard Step Test' showed significant correlation with *Dhatusarata*. Fitness, determined by Harvard step test is not sufficient to access the fitness related with *Dhatu Sarata*. Fitness may be the combined effect of genetically inherent physical, psychological, spiritual and social health. *Saratah Pariksha* is the second important factor of *Dasavidha Pariksha*. It can be said that *Sara Pariksha* itself is also competent for assessment of *Bala*. *Acharya Charaka* and *Vagbhata* during description of *Sara Pariksha* frequently mentioned that the main purpose of *Sara Pariksha* is to measure the strength of individual (CS.Vi. 8/118, A.H.Su. 3/117) *Charaka*, *Sushruta* and *Vagbhata* stated the number of *Sara* as eight i.e. *Tvak Sara*, *Rakta Sara*, *Mamsa Sara*, *Meda Sara*, *Asthi Sara*, *Majja Sara* and *Sukra Sara* and *Sattva Sara*. Presence of all the *Sara* is known as *Sarva Sara* and the individual possess maximum *Bala*. This assessment study also shows the association between *Dehabala* (physical fitness) and *Dhatusarata*.

CONCLUSION

Dehabala or physical Aerobic fitness by 'Harvard Step Test' has significant co-relation with *Dhatusarata* i.e. *Asthi*, *Majja* and to some extent with *Shukra*, *Mansa Sarata*. Majority (50%) subjects were having *Madhyam Sarata*. Most of the subjects i.e. 56% were excellent & good physical efficiency index. Statistically significant association was found between *Dhatu Sarata* and physical fitness.

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