QUANTITATIVE ESTIMATION OF BALA (PHYSICAL FITNESS) WITH RESPECT TO DHATU SARATA

Jagruti Chaple1,*, Ajay Dawale2

1Assistant Professor, Dept of Sharir-kriya, Mahatma Gandhi Ayurvedic College, Hospital and Research Centre Salod (H), Wardha, India
2Associate Professor, Community Medicine, JNMC, Sawangi (M) wardha, India

Received on: 22/08/13 Revised on: 28/09/13 Accepted on: 10/10/13

*Corresponding author
E-mail: jagrau@yahoo.com
DOI: 10.7897/2277-4343.04516
Published by Moksha Publishing House. Website www.mokshaph.com
All rights reserved.

ABSTRACT
Dhatusarata is described with respect to Sapta Dhatu viz. Rasa, Rakta, Mansa, Medas, Asthi, Majja, Shukra and Sattva 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. 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. ‘Bala’ (Physical fitness) of each student will be determined by Harvard step test. 1Harvard 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 Bala in the students and study the Dhatusarata and their association between them.

Keyword: Dhatusarata, Bala, Harvard Step Test

INTRODUCTION
As per Acharya Charak, one should not commit the mistakes by deciding any person as strong or weak by merely looking at the good or weak build up of body, as strength is not depend 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, Rakta, Mansa, Medas, Asthi, Majja, Shukra and Sattva 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 students and study the Dhatusarata and their association between them.

Aim
To study the Dhatu Sarata (Tissue quality) with the subjective parameters mentioned in the Text in Ayurvedic Students

Objectives
- To study the Bala (Physical fitness) by using “Harvard Step Test” in Ayurvedic Students
- To study the association between Dhatu Sarata (Tissue quality) and Bala

MATERIAL AND METHODS
Cross sectional study was conducted among first year Ayurvedic students at Mahatma Gandhi Ayurvedic College and research centre, Salod (H), Wardha, India. Study was conducted from June 2012 to November 2012 for the period of six months. All the 50 healthy students between 17 to 22 year age group were selected for the study. Approval was taken from the Institutional ethics committee (Datta Meghe Institute of Medical sciences, DU, Wardha, India) on 3.3.2012 with Ref. No.DMIMS (DU)/IEC/2012-13/688. Informed written consent was taken from the study subjects. Students 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 information of the volunteers were collected like diet (Veg / Non veg), exercise etc.

Assessment Criteria
For determining the Dhatu sarata1, when the positive features recommended by Acharyya 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
Physical fitness of each student 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)1. 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\(^5\). Physical efficiency Index was calculated with the following formula.

\[
\text{PEI} = \frac{\text{Duration of exercise in seconds} \times 100}{2 \times (A+B+C)}
\]

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.

It has been observed that those subjects having uttam sarata (10) were excellent with good physical efficiency index, while subjects having madhyam sarata (27) were average with low average physical efficiency index. Subjects having heen sarata (13) were poor physical efficiency index (Table 3). No significant difference was found among Male and female students. There is association between Dhatu sarata and physical fitness as ‘P’ value (Pearson value) is 0.003* which is less than 0.05.

**RESULTS**

A total of 50 students between 17 and 22 years of age were assessed for determining Dhatusarata and also Physical fitness. Dhatusarata (Tissue Quality) was found as per positive features recommended by Acharaya Charak (Table 1). Uttam sarata was found in 10 (20 %) Students, Madhyam sarata was found in 27 (54 %) students and heen sarata was found in 13 (26 %) students. Madhyam sarata was found more among females (58.53 %) as compared to male (33.33 %).

**DISCUSSION**

Physical Aerobic fitness by ‘Harvard Step Test’ has also significant correlation with 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)\(^1\). ‘Harvard Step Test’ showed significant correlation with some Dhatu Sarata. 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\(^5\). Sarata 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 (c s. 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 study also shows the association between physical fitness and dhatusarata.

**CONCLUSION**

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 (54 %) students were having Madhyam sarata. Most of the students (80 %) were having average, low average and poor physical efficiency index. Statistically significant association was found between Dhatu sarata and physical fitness.

**ACKNOWLEDGMENT**

The authors acknowledge the support and facilities received from the Department of Kriya Sharr, Dr. Dandekar, HOD, Dept of Kriya sharr for cooperation, Dr S. Bhutada, Dean Faculty of Ayurveda Mahatma Gandhi Ayurved College, Hospital and RC; Salod (H) Wardha, India DMIMS (DU) for his constant encouragement.

**REFERENCES**

4. TripathiPiyush Kumar, Patwardhan Keshor, Singh Girish. The Basic Cardiovascular Responses to Postural Changes, Exercise, and Cold Pressor Test: Do They Vary in Accordance with the Dual

---

**Table 1: Sex-wise distribution of students according to Dhatusarata**

<table>
<thead>
<tr>
<th>Dhatusarata</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uttam sarata</td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Madhyam sarata</td>
<td>3</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Heen sarata</td>
<td>3</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>41</td>
<td>50</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PEI</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Average</td>
<td>10</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Low average</td>
<td>14</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Poor</td>
<td>10</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>

**Table 3: Association between Dhatusarata and physical efficiency index**

<table>
<thead>
<tr>
<th>PEI</th>
<th>Dhatusarata</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uttam sarata</td>
<td>Madhyam sarata</td>
<td>Heen sarata</td>
</tr>
<tr>
<td>Excellent</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Good</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Low average</td>
<td>0</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>27</td>
<td>13</td>
</tr>
</tbody>
</table>

Cite this article as:

Source of support: Nil, Conflict of interest: None Declared