

***Asthi Dhatu Saarta* and Serum Calcium Levels- An Analytical Study**

RACHNA GUPTA*, DARSHANA¹ AND AMIT CHOWDHARY²

Department of Kriya Sharir, Desh Bhagat University, Mandi Gobindgarh-147 301 (Punjab), India
*(e-mail: rgupta00@gmail.com; Mobile: 89684 18501)

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ABSTRACT

The present study, aims to explore the correlation between the grades of *AsthiDhatuSaarta* with optimal levels of serum calcium of the body. The excellence of *Asthi Dhatu Saarta* reflects the quality and structural strength of the body's fifth tissue i.e *AsthiDhatu* as described in *Ayurvedic* classics. The study is expected to reveal a measurable relationship between the calcium levels and the degree of *Asthi Dhatu Saarta*, thus validating an ancient *Ayurvedic* concept through modern parameter. Such correlation will establish reliable, quantifiable markers for *Dhatu* assessment and promote integrative diagnostic approaches in *Ayurvedic* physiology.

Key words: *Asthi Dhatu Saarta, Dhatu Pariksha, Saara Pariksha, serum calcium levels*

INTRODUCTION

The term *Dhatu* represent elements which are responsible for formation of the basic structure of the body. They provide both support and nourishment to various parts of the body. *AsthiDhatu* is fifth among seven *Dhatu* and is described as *Kathintam* (hardest) *Dhatu* blessed with the function of *Sharira Dharana*. It gives shape to the body and protects the vital organs. It forms skeleton of the body. In *Charaka Samhita Vimanasthana* the concept of *Dashavidha Pariksha* has been explained with great significance. Among *Dashavidha Pariksha*, the concept of *SaaraPariksha* i.e *Dhatu Saara* is one such important concept, which describes the sufficient nourishment and optimum state of the body tissues, as an important health level indicator. The *Saara Pariksha* is an important measurement tool for assessment of strength (*Bala*) of a person. It helps in considering a person as *Uttama Bala/Madhyam/Hina Bala* by merely observing physical, physiological and psychological traits of individual. It can be said that a person who possesses strong *Saarta* will certainly have good *Bala*. According to *Acharya Sushrut*, *Bala* is the supreme essence of all the *Dhatu* beginning from *Rasa* and ending with *Sukra*. *Asthi Dhatu* being an important *Dhatu* for *Dharana* of entire body provides the physical frame to the body structure just like the

duramen inside the stem of a tree remains strong until the end of its life. The skin and muscular tissues tend to lose its strength, but bone tissue remains strong.

All medical sciences identify and name new diseases from time to time. But at similar junctures, *Ayurveda* views and responds to it on the basis of the changes in the signs and symptoms and their in-depth analysis. Charting a course of treatment for such diseases would bear fruit only if the signs and symptoms of diseases are observed in terms of *Ayurvedic* symptomatology followed by the construction of a supporting body of knowledge regarding its etiology and pathology, all of which is done without deviating from the acknowledged principles of *Ayurveda*. Preventive measure treatment approach and various tools of examination plays crucial role in overall assessment of an individual.

The postulations put forth by the founders of *Ayurveda* are very methodical and relevant to the present age. One has to confirm the knowledge obtained by the theoretical source by experiencing it through continuous observations and combining it with new concepts and doing it practically to bring about a scientific revolution. So, it was an attempt to clinically correlate the features of *Asthidhatu Saarta* as explained in *Ayurveda* with the serum Calcium levels of an individual.

¹Department of Kaya Chikitsa, Desh Bhagat University, MandiGobindgarh-147301 (Punjab), India.

²Department of Kaya Chikitsa, Devbhoomi Medical College of Ayurveda and Hospital, Dehradun-248 007 (UttaraKhand), India.

Table 1. Number of subjects according to age

Age group (years)	Subjects	Percentage
21-30 Years	41	27.33%
31-40 Years	109	72.67%
Total	150	100%
Mean±SD	33.68±5.57	
Median	35.00	
Range	22-40	

MATERIALS AND METHODS

Study design: Observational Study

Study Level: OPD level

Sample Size: 150

Inclusion criteria

- Subjects within the age group of 20 to 40 years
- Healthy subject

Exclusion criteria

- Lactating and pregnant women.
- Patient who has undergone chemotherapy and radiotherapy.
- Patient having endocrine disorders like hypogonadism, hyperthyroidism.
- Person suffering from metabolic disorders
- Trauma/external injuries

Plan of study

- *AsthiDhatuSaarta* will be assessed in individuals.
- Serum calcium levels will be tested.

Subjective parameter: *Saarta* of persons shall be evaluated using standardized *Asthi Saarta* proforma which was compiled from Dr. Hemangini Waghulade's Vishuddhatara app.

Objective Parameter: The objective parameter taken to analyze the quality of bone tissue is serum calcium levels.

RESULTS AND DISCUSSION

150 subjects who were selected for the observational study were recorded in the proforma and upon evaluating their serum calcium levels, the observations were analyzed, tabulated and presented in the form of tables (Table 1, 2, 3, 4) and fig. (Fig. 1, 2, 3, 4).

Based upon the observational study to assess *Asthi Dhatu Saarta* described in *Ayurveda* and

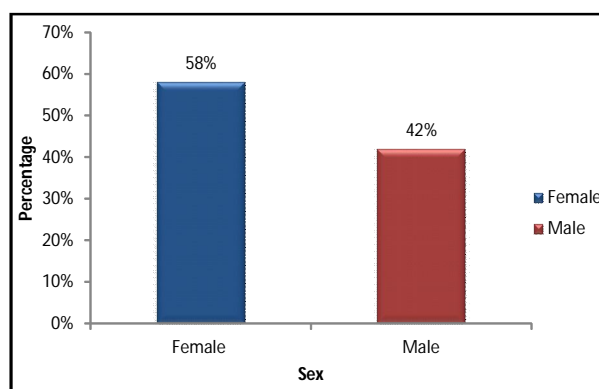


Fig. 1. Percentage of subjects according to sex.

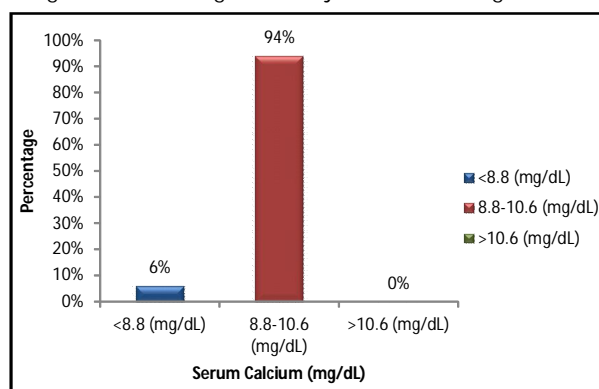


Fig. 2. Percentage of subjects according to serum calcium level (mg/dl).

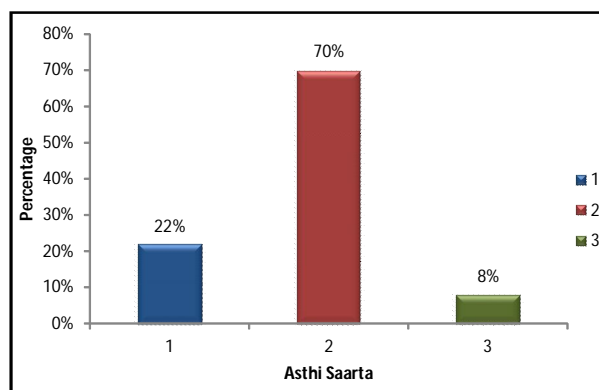


Fig. 3. Percentage of subjects according to *Asthi Saarta*.

the assessment done was scored in percentage. If the percentage score was 75% or more, then quality of the bone tissue was excellent (*Pravar*). If it was between 50 to 75%, it's medium (*Madhyam*) and if it was less than 50% it was of poor quality (*Avar*).

When Serum Calcium levels were evaluated: Subjects with level less than 9mg/dl were found to have poor i.e. *Avar Asthi Dhatu Saarta*. Subjects with level between 9-9.9mg/dl were found to have medium i.e. *Madhyam Asthi Dhatu Saarta*. Subjects with level less than 10mg/dl

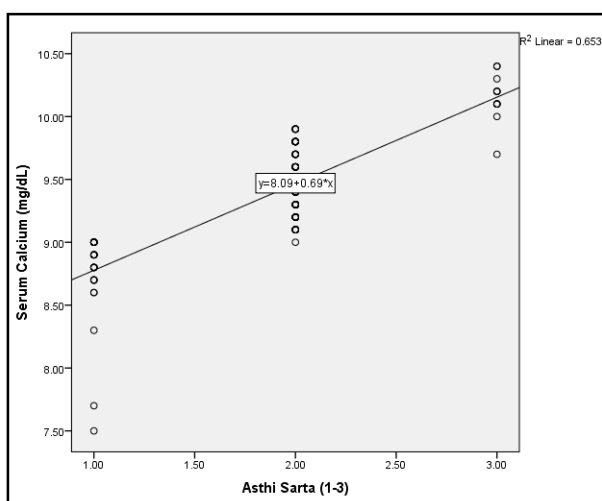


Fig. 4. Co-relation of serum calcium level (mg/dl) with *Asthi Saarta*.

were found to have optimum i.e. *Pravar Asthi Dhatu Saarta*.

After studying all the observation and statistical datato assess *Asthi Dhatu Saarta* described in *Ayurveda* and according to the scoring adopted it was found that:

- Subjects with score 3 had excellent bone tissue quality or *Asthi Dhatu Saarta*
- Subjects with score 2 had medium bone tissue quality or *Asthi Dhatu Saarta*

- Subjects with score 1 had poor bone tissue quality or *Asthi Dhatu Saarta*.

Since observations were quantitative, ANOVA test was applied to the collected data to find the difference between mean serum calcium levels and features of *Asthi Saarta* and a strong association was found between the two.

Chi-Square test was carried out to test association between *Asthi Saarta* and serum calcium levels. The P-Value came to be less than 0.01. Hence, it was concluded that there was significant association between *Asthi Saarta* and serum calcium levels. When *Asthi Saarta* increased, serum calcium levels also increased.

CONCLUSION

The features of *Asthi Saarta* explained in *Ayurvedic* texts were mainly subjective and it was difficult to mention one's *Asthi Saarta* based on subjective parameters. So, looking into the *Asthi's* composition and to access their strength, serum calcium level was selected as the parameter to measure *Asthi Saarta* in an individual.

- Data collected in this study underscored the significant

Table 2. Numberof subjects according to age with sex

Age group (years)	Female		Male		Total	
	Subjects	Percentage	Subjects	Percentage	Subjects	Percentage
21-30	25	16.67%	16	10.67%	41	27.33%
31-40	62	41.33%	47	31.33%	109	72.67%
Total	87	58%	63	42%	150	100%

$\chi^2 = 0.205$; p value= 0.651 (NS).

Table 3. Association of serum calcium level (mg/dl) with *asthisarta* using anova test

<i>Asthi Saarta</i>	N	Mean	SD	Std. Error	95% Confidence interval for Mean		F	p value
					Lower bound	Upper bound		
1.00	33	8.776	0.343	0.060	8.654	8.897	138.438	0.001
2.00	105	9.467	0.249	0.024	9.419	9.515		
3.00	12	10.150	0.188	0.054	10.030	10.270		
Total	150	9.369	0.453	0.037	9.296	9.442		
		Sum of Squares	df	Mean Square	F	p value		
Between Groups		19.935	2	9.967	138.438	0.001		
Within Groups		10.584	147	0.072				
Total		30.519	149					

relationship between *Asthi Saarata* and serum calcium levels of an individual.

- ANOVA test was applied to the collected data to find difference between mean serum calcium levels and features of *Asthi Saarata* and a strong association was found between the two.
- Chi-Square test was carried out to test association between *Asthi Saarta* and serum calcium levels. The P-Value came to be less than 0.01. Hence, it was concluded that there was significant association between *Asthi Saarta* and serum calcium levels.
- Based on the results and discussion of the facts, one can conclude that serum calcium level can be used as a standardized parameter to analyse *Asthi Saarta* i.e optimum excellence of bone tissue.

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