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## AN OBSERVATIONAL STUDY OF *ASTHIKSHAYA* IN DIFFERENT *DEHAPRAKRITI* WITH SPECIAL REFERENCE TO BONE MINERAL DENSITY IN COLLEGE GOING STUDENTS.

Vd. MONICA DASHRATHRAO MADANE<sup>1\*</sup>, DR. R. S. DHIMDHIME<sup>2\*</sup>

1. PG Scholar (Kriya Sharir), Government Ayurved College, Osmanabad, Maharashtra-413501

2. Professor and Head of Department (Kriya Sharir), Government Ayurved College,

Osmanabad, Maharashtra-413501

Email id: [monikamadane111@gmail.com](mailto:monikamadane111@gmail.com)

### ABSTRACT

Ayurveda aims to cure the diseases that caused by any change in the vitals. Vata, Pitta and Kapha are the main vitals according to the Ayurveda. These are having the great power to maintain the healthy environment within the body or to shake up the balance and turn the condition into the diseased one. Vata, Pitta and Kapha are the main ingredients in evolution of the universe as well as body. These three basic fundamentals are responsible for the characteristics of the person. The personalities are explained as prakriti in Ayurveda. The composition of dosha in prakriti formation has role in the person's physical appearance and mental behavior. Among the *Saptha Dhatus* the *Asthi Dhatu* is the one which is consecrated with the function of *Shareera Dharana*. *Asthi Dhatu* is the *Dhatu* which gives a profile to the body and protects the imperative organs. *Asthi dhatu* which has the function of *dharana*. Carrying the weight of body is directly related with the principle of *Dosha Vata*. Being the principle seat of *Vata* dominance in pathology any dearrangements in *Asthi dhatu* leads to different kinds of diseases. The *Asthi dhatu* is considered as the *Aashraya* of *Vata* because of its *Kharatwa* (hardness) due to *Prithvi Mahabhuta* and *Vata* is *Sushir* (porous) because of its *Aakash Mahabhuta*. So, if there is *Vata Vruddhi* that will lead to *Sushirta* in *Asthi dhatu* causing *Asthi Kshaya*. So it is important to clinically evaluate the features of *Asthidhatu Kshaya* as the beginning signs of osteoporosis/ osteopenia.

Keywords: *Ayurveda*, *Asthi Dhatu*, *Asthi-Dhatu kshya*, *Dehprakriti*, Osteoporosis, T-score, BMD.

## INTRODUCTION

Ayu means the span of life and Veda means the knowledge. Science Ayurveda is an ancient medical science which provides knowledge of eminence of living body and extent of span of life.<sup>[1]</sup> The person whose body is in equilibrium with all *Dosha, Agni, Dhatu, Mala*, who is having cheerful *Atma, Indriya, Mana* should be called healthy.<sup>[2]</sup> Only person will be incapable of being attacked by the diseases and will be able to fulfill all his desires when he will be able to understand what is good and what is bad for his physical and mental health.<sup>[3]</sup> Body and mind both are the sites for different diseases. In today's modern lifestyle with full of competition the person has to take care of his body with mind as well. In this sedentary and digital world the person goes under mental pressure comparatively more than physical one.<sup>[4]</sup> Ayurveda highlighted on treatment of disease as well as maintaining the health of an individual, therefore every research in ayurveda is aimed for the prevention of diseases and treatment of diseases as well. For the purpose of the same Ayurveda already explained the different ways to save ourselves from the diseases in the form of *Dinacharya, Rutucharya, Acharrasayan*. But, in fast and furious lifestyle people don't get time to follow the same.<sup>[5]</sup>

Prakriti is fundamental form of a human being. It determines the nature, character, constitution, original substance in person. Due to close connection with *dosha*, qualities of *dosha* expressed on body in structure, morphology, physiology and psychology.<sup>[6]</sup>

Among the *Saptha Dhatus* the *Ashti Dhatu* is the one which is consecrated with the function of *Shareera Dharana*. *Asthi Dhatu* is the *Dhatu* which gives a profile to the body and protects the imperative organs.

*Asthi dhatu* which has the function of *dharana*. Carrying the weight of body is directly related with the principle of *Dosha Vata*. Being the principle seat of *Vata* dominance in pathology any dearrangements in *Asthi dhatu* leads to different kinds of diseases.

Thus a state of symmetry of *Dhatus* is health and the commotion of the same is termed as disease.<sup>[7]</sup> This *Vaisamyam* or the commotion can be broadly classified in to two types, *Vruddhi* (increase qualitative or quantitative) and *Kshya* (decrease qualitative or quantitative)

In Ayurveda both *Vridhhi* and *Kshaya* are mentioned as pathological states of *Dhatu*.<sup>[8]</sup> Osteoporosis can be placed under the spectrum of *AsthiKshaya*. *AsthiKshaya* is a condition in which there will be *Kshaya* (diminution) of *Asthi dhatu* (bone tissue). *AsthiKshaya* may be compared to osteoporosis in which there is decrease in bone mass leading to bone fragility and susceptibility to fractures.

## AIM OF THE STUDY

To assess the *AsthiKshya* in different *Dehprakriti* of college going students.

## OBJECTIVES OF THE STUDY

- To assess the *Dehprakriti* with the help of *Dehprakriti* proforma.
- To assess the *AsthiKshya*

Lakshana with the help of Asthikshya Lakshana questionnaire.

- To study the relation between Asthikshya and Dehprakriti

## REVIEW OF LITERATURE

*Prakriti* is an expression of special characteristics due to preponderance of *Tridoshas*. According to *Kriya Sharir's Dosha Dhatumala siddhanta*, all the processes are controlled by *Tridoshas*. Thus, healthy status of body requires the maintenance of *Prakriti*. By knowing *Prakriti* person gets to know about strength to fight lifestyle disorders, because the person with balance in *Prakriti* is said to be having greater immunity.<sup>[9]</sup>

*Prakriti* examination is an important part of *Ayurveda*. It is mentioned in *Dashavidha Rogi Parikskha*. Around us in a same country, in the clan, at the same time born, no two people of the same age are found to be exactly the same. There are some differences between them. There are differences in the physical, mental, anatomical, physiological conditions of the siblings too. Sometimes similarities can be found in case of *Sara*, *Samhanana*, body mass, interests, dislikes of two people. But there are definite differences in the nature of the two. That is why in practice we call a person as much as *Prakriti*.<sup>[10]</sup>

## CONCEPT OF DEHA PRAKRITI

People are borne with various proportions of *Doshas*. Their body constitution is referred accordingly. Those borne with equal proportion of three *Doshas*, i.e.

ratio of *Vata*, *Pitta* and *Kapha* equal to each other are *Samapittanilakapha*. These individuals are generally healthy people and remain healthy. Few of them show predominance of one *Dosha*. Those exhibiting predominance of *Kapha* are called *Shleshmala*, predominance of *Pitta* or *Vata* are called *Pittala* and *Vatala* respectively. These people frequently fall sick.<sup>[11]</sup>

The physical constitution of a foetus is determined by the predominance of *Doshas* accordingly. *Prakriti* of person shows characteristics according to morphology, physiology, behaviour and relation to ecology. So, these *Doshaj Prakritis* are due to predominance of *Doshas* since birth. This is called as '*Deha Prakriti*'.

During conception, a few individuals present equal ratio of three *Doshas*, which is called *Sama-Prakriti*. Another category is single *Dosha* dominant *Prakriti*. It is *Vatala* if *Vata* *Dosha* is dominant, *Pittala* if *Pitta* *Dosha* is dominant and *Sleshmala* if *Kapha* *Dosha* is dominant. *Sama Prakriti* people remain healthy. Single *Dosha* dominated and mixed (two *Dosha* at a time; one less dominant) category usually exhibit some sort of minor or major ailment. They need to observe regimen for every day and every season regularly. Failing to do so begins accumulation dominant *Dosha*.

## CONCEPT OF ASTHIKSHYA

*Asthi Kshaya* (decrease in bone tissue) is a condition explained in *Ayurveda*, under the heading of *Ashtadasha Kshayas*. In *Asthi Kshaya* there is diminution of *Asthi Dhatu*. Similar to this, there is a condition known as *Osteoporosis* in western medicine which means 'Porous bones' or "the brittleness of the bones due to

increased porosity from loss of mineral substance" causing decrease in the bone tissue & leading to increased risk of fractures. According to the principles of *Aashrayaashrayee Bhava*, *Asthi Dhatu* is the seat of *Vata Dosha* and *Asthi & Vata* are inversely proportional to each other regarding increase and decrease. Increase of *Vata* leads to decrease of *Asthi*.

The term *Asthi Kshaya* is not a single word instead it is composed of two separate terms "*Asthi*" and "*Kshaya*". According to *Shabda kalpa drum*, the word *Asthi* is the resultant of the combination of the root word "*As*" to "*Kthin*". They combine to form the word "*Asthi*" which means "To Stay" or in the sense of stability (*Shabda Kalpa drum*).

*Asthi Kshaya* is mentioned as an Independent condition. *Asthi Kshaya* means decrease in the bone tissue. In nutshell, Provocated *Vata* which is lodged in its *Sthana Asthi Dhatu* in *Jarawastha*; (where *Kshaya* of all *Dhatu*s occurs as *Swabhava*), increases *Kshaya* of *Asthi Dhatu* especially because of their unique relationship.<sup>[12]</sup>

*Asthi kshaya* is a condition in which there is decrease in the *Asthi dhatu* leading to many awful effects. It can be compared with Osteoporosis in which there is decrease in the Bone Mineral Density (BMD) leading to increased risk of fractures. Two conditions mentioned in Ayurveda may be discussed in this regard. One is *Asthi kshaya* and the other is *Asthi saushirya*. *Asthi saushirya* is not mentioned as a separate condition but, as a symptom of *Majja Kshaya* whereas, *Asthi Kshaya* is mentioned as an independent condition.

There are no signs and symptoms of *Asthisauhirya* but, the signs and symptoms of *Asthi kshaya* are mentioned separately. The treatment of *Asthi Kshaya* is also mentioned separately. The important point is that, the signs and symptoms of *Asthi Kshaya* i.e. *Asthi-sandhishoola*, *Kesha*, *Roma*, *Nakha*, *Danta Vikara* and *Daurbalya* are exactly the same as the updated signs and symptoms of osteopenia or osteoporosis. Now recent era modern pathology have agreed that there is definite association between hair, nails and teeth pathology and osteopenia/osteoporosis. Hence, it may be understood that *Asthi kshaya* is more suitable condition than *Asthisauhirya* to be correlated to osteopenia and osteoporosis. *Asthi kshaya* is decrease in the bone tissue and *Asthi saushirya* means porosity in bones.

*Hemadri* has commented on the word '*Sauhirya*' as '*Sarandhratvam*' which means with pores. This condition is explained in the context of *Majja kshaya*. Osteoporosis means the decrease in the bone tissue and not the bone marrow. More over there is another condition termed as Osteopenia, which is a pre stage of Osteoporosis in which there is decrease in the bone mineral density.

Osteopenia is a loss of bone mass or bone mineral density. It is the stage before osteoporosis, and without treatment, it can progress to osteoporosis. Osteoporosis happens when bone mineral density and bone mass decrease even further or when there are structural changes to bone tissue. Osteoporosis weakens the bones and increases the risk of fractures. When *Asthi kshaya* happens in the body simultaneously *Vatavridhi* also occurs. *Asthi kshaya* may be compared to osteoporosis, in which there

is decrease in bone mass and leading to increase in bone fragility and susceptibility to fractures.

## MATERIAL AND METHODS

### MATERIAL

1. Literary reviews of *Deha Prakriti* and *Asthikshya* were taken from various *Samhitas* including *Bruhatrayis* and *Laghutrayis* and their concerned commentaries.
2. Assessment of *Deha Prakriti* with the help of questionnaire.
3. Assessment of *Asthikshya Lakshna* with the help of questionnaire .

### METHODOLOGY

#### Type of study

Present study is an Observational cross sectional study.

#### Place of study

Random professional undergraduate course institute was selected according to inclusive criteria.

#### Sample size

n = 100

#### Sampling technique

Simple Random Method

#### Criteria of selection for study

#### Inclusion criteria

- Apparently healthy undergraduate students.
- Students aged between 18 to 26 years.

- Students irrespective of gender, cast, religion, economic Status.

#### Exclusion criteria

- Students with any major illness or psychological problems.
- Those with age less than 18 years and more than 26 years will be excluded.
- History of any psychiatric or physical illness.

#### Withdrawal criteria

Those who are not willing for participation in this study at any stage while filling the questionnaires.

### STUDY INSTRUMENT

1. MUHS approved *Deha Prakriti* proforma for assessment of *Deha Prakriti*.
2. Bone Mineral Densitometer to check BMD Score (T- Score).
  - T scores between -1 and -2.5 represents osteopenia
  - T score below -2.5 represents osteoporosis and a high risk of fracture.
  - T score below -2.5 plus one or more fragility fractures is indicative of established osteoporosis.
  - Bone densitometry measures bone density, not bone turnover or bone stability.
3. *Asthikshya Lakshna* questionnaire for the assessment *Asthikshya Lakshna*.

### Grading and scoring of *Asthi*shaya lakshanas:-

#### A) *Danta vikara/pata* (Dental deformity/fall):

- 1) No dental deformity - 0
- 2) Occasional dental pain with dental caries or loosening of at least one tooth. - 1
- 3) Dental pain that don't responds to analgesics along with caries/loosening/loss of 2-4 teeth. 2
- 4) Loosening / loss of 4-8 teeth. -3

#### B) *Asthi shula/tod* (Pain in bones)

- 1) No piercing pain in bones. -0
- 2) Mild piercing pain in bones not affecting daily activities. -1
- 3) Occasional moderate piercing pain in bones not affecting daily activities.

Pain can be relieved by rest no need of medication. -2

- 4) Frequently severe piercing pain in bones affecting daily activities. Patient needs medication. 3

#### C) *Kesha pata* (Hair fall):

- 1) No hair fall 0
- 2) Hairs fall once in the morning while washing / combing. 1
- 3) Hairfall even without combing and raised hairline in frontal region (mild baldness). 2
- 4) Visible or significant baldness in frontal or vertex region. 3

#### D) *Nakha vikara/paat*- Nail deformity

Table: - Gradation of *Asthi*shaya

- 1) No Nail deformity 0

2) Mild loss of natural texture & maliability of nails. 1

3) Moderate loss of texture & maliability of nails. 2

4) Visible brittleness of nails (which breaks easily). 3

#### E) *Rukshata* (Dryness)

- 1) No dryness. 0

2) Occasional dryness without winter season 1

3) Visible dryness, mild dull white streaks after scratching on the skin which disappears after sometime. 2

4) Dryness/roughness, bright white streaks on the skin remaining for a considerable time. 3

#### F) *Sandhishaitilya*

- 1) No pain on walking. 0

2) Mild pain but no difficulty in walking. 1

3) Walking with severe pain and difficulty. 2

4) Unable to walk. 3

#### G) *Shrama*

- 1) No fatigue. 0

2) Fatigue occasionally in doing heavy work. 1

3) Fatigue in doing some extra work and not otherwise fatigue In carrying out routine work. 2

4) Fatigue even without doing work. 3

GRADE	ASTHIKSHAYA	SCORE RANGE
1	AVARA	0-7
2	MADHYAMA	7-14
3	PRAVARA	14 – 21

## OBSERVATION AND RESULT

Table no 1: Shows *Deha Prakriti* wise distribution -

Sr. No.	<i>Deha prakriti</i>	No of Patients	% of patients
1	Kapha Pitta	16	16
2	Kapha Vata	13	13
3	Pitta Kapha	13	13
4	Pitta Vata	24	24
5	Vata Kapha	6	6
6	Vata Pitta	28	28
7	Total	100	100

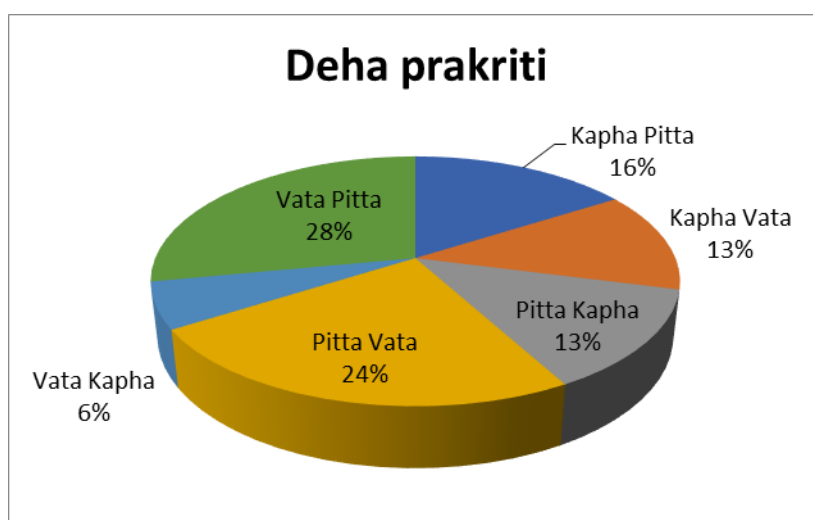


Figure 1: Shows *Deha prakriti* wise distribution

In present study out of 100 students maximum number of students i.e.

28 (28%) were having *vatapradhan pittanubandhi prakriti*.

24 (24%) students were having *pittpradhan vataanubandhi prakriti*.

16 (16%) students were having *kaphapradhan pittanubandhi prakriti*.

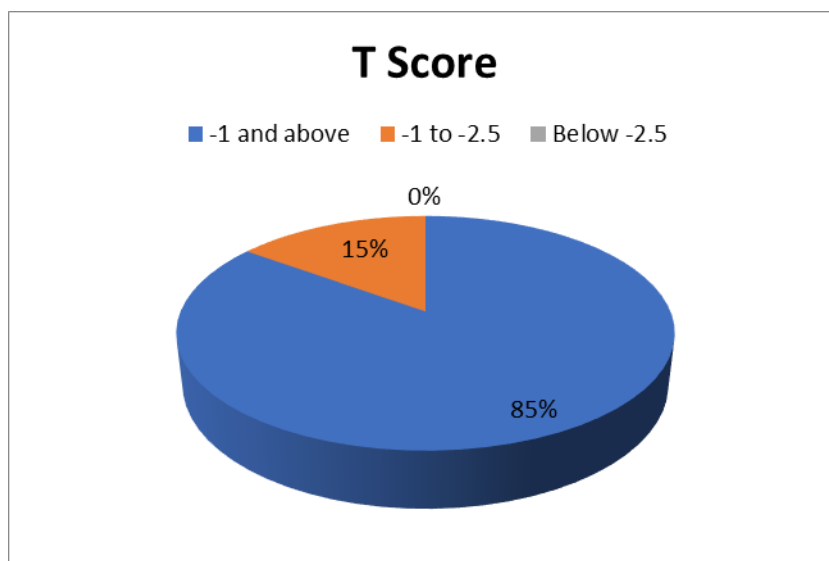
13 (13%) students were having *pittapradhan kaphanubandhi prakriti*.

13 (13%) students were having *kaphapradhan vatanubandhi prakriti*.

6 (6%) students were having *vataapradhan kaphanubandhi prakriti*

**Table no 2: Shows T Score wise distribution -**

Sr. No.	T Score	No of Patients	% of patients	Result
1	-1 and above	85	85	Normal
2	-1 to -2.5	15	15	Osteopenic
3	Below -2.5	0	0	Osteoporotic
4	Total	100	100	



**Figure 2: Shows T Score wise distribution**

In present study out of 100 students maximum number of students shows

on the basis of BMD T-score findings 85% students were shows T-score range between -1 and above i.e. normal .

15% students were shows T-score range between -1 to -2.5 i.e. osteopenic.



Table no 3: Shows Overall Gradation in *Asthikshaya* -

Sr. No.	Grade	No. of Patients	% of patients
1	Pravara (0 to 7)	91	91
2	Madhyama (8 to 14)	9	9
3	Avara (15 to 21)	0	0
4	Total	100	100

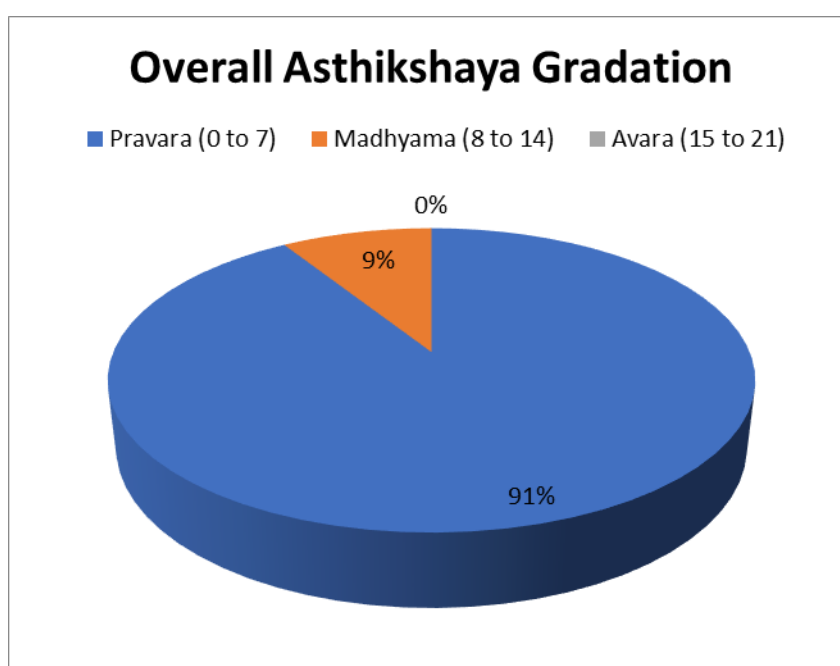


Figure 3: Shows Gradation in *Asthikshaya*

During assessment of overall *Asthikshaya gradation*, it was found that out of 100 students 91 (91%) students were shows *PRAVARA Asthikshaya* i.e. grade (0 to 7) and 9 (9%) students were shows *MADHYAMA Asthikshaya* i.e. grade (8 to 14).

## DISCUSSION

### Correlation of BMD and *Asthikshaya*

BMD	<i>Asthikshaya</i>	Total
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	<i>Avara</i>	<i>Madhyama</i>	<i>Pravara</i>	
<b>-1 and Above</b>	84	1	0	85
<b>-1 to -2.5</b>	7	8	0	15
<b>Total</b>	91	9	0	100

After applying chi-square test as value of p is less than 0.05, significant difference was found between BMD and *Asthikshaya*. So stastically it was concluded that there is significant association seen between BMD and *Asthikshaya*.

#### T. Correlation of *Prakriti* and BMD

BMD	<i>Deha prakriti</i>						Total
	<i>KP</i>	<i>KV</i>	<i>PK</i>	<i>PV</i>	<i>VK</i>	<i>VP</i>	
<b>-1 and above</b>	16	12	13	20	5	19	<b>85</b>
<b>-1 to -2.5</b>	0	1	0	4	1	9	<b>15</b>
<b>Total</b>	<b>16</b>	<b>13</b>	<b>13</b>	<b>24</b>	<b>6</b>	<b>28</b>	<b>100</b>

In present study the chi square test was applied as per need. As value of p is less than 0.05, significant difference was found between *Prakriti* and BMD. So statistically it was concluded that there is significant association between *Prakriti* and BMD. So present study shows that the *Vata-Pittanubandhi Prakriti* were associated with severe grades of T score of BMD.

#### U. Correlation of *Prakriti* and *Asthikshaya*

<i>Asthikshaya</i>	<i>Deha prakriti</i>						Total
	<i>KP</i>	<i>KV</i>	<i>PK</i>	<i>PV</i>	<i>VK</i>	<i>VP</i>	
<b><i>Pravara</i></b>	16	13	13	21	6	22	<b>91</b>
<b><i>Madhyam</i></b>	0	0	0	3	0	6	<b>9</b>
<b>Total</b>	<b>16</b>	<b>13</b>	<b>13</b>	<b>24</b>	<b>6</b>	<b>28</b>	<b>100</b>

In present study the chi square test was applied as per need. As value of p is less than 0.05, significant difference was found between *Prakriti* and *Asthikshaya*. So statistically it was concluded that there is

significant association between *Prakriti* and *Asthikshaya*. So present study shows that maximum *Asthikshaya Lkshana* was found mostly in *Vatapradhan Pittanubandhi Prakriti*.

## CONCLUSION

The present study entitled as — AN OBSERVATIONAL STUDY OF ASTHIKSHAYA IN DIFFERENT DEHAPRAKRITI WITH SPECIAL REFERENCE TO BONE MINERAL DENSITY IN COLLEGE GOING STUDENTS was undertaken to determine the exact relation between *Deha Prakriti* and *Asthikshaya* in detail. After going through a detailed theoretical and practical study, basic ancient literature, observations, statistical interpretations, analysis and discussion the conclusion may be drawn in following ways.

1. There is a significant Relation of ASTHIKSHAYA and *Deha Prakriti* exists which was the primary objective of the study.

2. *Vata Dosha dominant Prakriti* i.e. *Vata Pradhan Pittanubandhi Prakriti* is more prone for development of ASTHIKSHAYA.

1. The "Chi-Square test" which was done to compare the observational data of *Asthikshaya Lakshana* and BMD (t-score) levels but on the basis of percentage of approximation in the symptoms and t- score It can be said that the *Asthikshaya Lakshana* is nothing but preosteoporotic symptoms as per Ayurvedic and Modern text.

2. During clinical assessment of *Samanya Lakshana* of *Asthikshaya*; maximum students were found with *Avara AsthiKshaya Lakshana* and having BMD T-score -1 and above (i.e normal) while minimum students were

found with *Madhyama AsthiKshaya Lakshana* and having BMD T-score between -1 to -2.5(i.e. osteopenic).

3. The amount of bone gained during adolescence should equal the amount of loss during the rest of adult life, if you do not build enough bone in adolescence, you will have, too little to "draw from" during the later part of life. Low-lifetime calcium intake, underweight, menopause and sedentary life style were the risk factors found in majority.
4. Life style modifications, *Nidana Parivarjana* and *Pathyapathya* have significant influence in decreasing bone resorption. Although exercise will not completely prevent from bone loss, It can help slow the process.
5. Osteoporosis is an age related degenerative disease which affects both the sexes equally but in the women's it manifests early because of menopausal stage.
6. Although heredity and certain unchangeable factors such as race, body build and gender, play a vital part in determining peak bone mass. Up to 50% can be attributed to life style behaviors and dietary habits.
7. *Asthi kshaya* is more prevalent in the persons with *Vata predominant Prakriti*. because *vata* is the responsible dosha for *Asthi kshaya*.
8. The *prakriti* of a person provides physical, psychological, immunological knowledge of that person and

also indicates the physiological strengths and weaknesses, even the susceptibility of that individual to various diseases. So, knowledge of *Prakriti* should be utilized in diagnosis, treatment and maintenance of health.

11. Among the vikritis of Asthi dhatu, Asthi kshaya is one in which there is kshaya (diminution) of the Asthi dhatu, which may be co-related to osteoporosis of the modern science.

2. Conclusion from the statically study:

- In present study, statically there is significant association between *Asthikshya with Dehaprakriti*.
- In *Dwindwaj Prakriti Vatapradhan-Pittanubandhi Prakriti* is strongly associated with *Asthikshya Lakshana*.
- *Vatapradhan Pittanubandhi Prakriti* shows lowest T score (BMD) and *Kaphapradhan Pittanubandhi Prakriti* shows highest T score (BMD).

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