



THE STUDY OF MARGAGA DHATU CONCEPT IN SANDHIGATA VATA WITH SPECIAL REFERENCE TO ASTHI DHATU

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ABSTRACT

According to Ayurveda, Dhatus are one of the important biological elements to maintain the Physiology and Anatomy of the body, but any vitiation in these factors leads diseases. Acharya Chakrapani has postulated the concept of Poshaka and Sthayi Dhatus. "यतो द्विविधो रसः – स्थायि पोशकश्चेति, तत्र धातु पोशक पोश्यरससयो भेदविवक्षय भेद उक्तः इह स्थयि पोशकरसस्मावप्येकतया निर्दिष्टोऽव, स्तयिरस पोशकरस भगयोऽस्थनभेदद्वभावादेकत्वम्, एवम् क्रित्व सप्तधतुकम् सरीरमुच्यते" (चक्रपानि च. चि. 15) Thus, the seven Dhatus can be further classified into two types: - Sthayi (Poshya) and Asthayi (Poshaka) Dhatus. The Sthayidhatus are Dhatus proper, which stays constantly in the body right from birth to death. They are responsible for the support and maintenance of the body. Their increase or decrease depends on Asthayidhatus. The Asthayidhatus are the elements that are formed after Bhutagni paka. They are the specific nutritive homologues of the particular Dhatus. They circulate through specific Strotas and nourish specific Dhatus. The Sthayidhatus receive the nutrition and convert them to similar body tissues by the help of specific Dhatwagni. Asthayi Dhatus are important for nutrition and to compensate the wear and tear phenomenon of the body. Sandhigata vata is a one disease in which Asthi Dhatus gets vitiated. Ayurvedic pathology is based on Kshaya, Vriddhi lakshanas of Dosha, Dhatus and Mala. The abnormality of Dosha, Dhatus and Mala is diagnosed by their Kshaya, Vriddhi and Prakop lakshanas. Along with these lakshanas, if we find some supportive Markers in blood or serum, which simulate margaga Dhatus, it will support clinical diagnosis and would become one objective parameter which can be clinically applied.

KEYWORDS: Sthanasthadhatu, Margasthadhatu, Sandhigata vata, Osteoarthritis, Osteoporosis, Dhatus kshaya, Dhatus vriddhi, Bone pathology markers.

INTRODUCTION

तेषां प्रकोपात् स्थानस्थ्याश्चैव मार्गगाश्च शरीरधातवः प्रकोपमापद्यन्ते इतरेषां प्रकोपादितराणि च त्त्रोतांसि त्त्रोतांस्येव धातवश्च धातून् प्रदूषयन्ति प्रदुष्टाः तेषां सर्वेषामेव वातपित्तश्लेष्माणः प्रदुष्टा दूषयितारो भवन्ति दोषस्वभावादिति ॥ (च.वि.५/९)

Sandhigata Vata is the commonest form of articular disorders. It is a type of Vata vyadhi which mainly occurs in Vriddhavastha (Old Age) due to Dhatus kshaya. Being a Vata vyadhi, located at Marmasthisandhi makes it Kashtasadhya. Sandhi Shoola (Joint Pain) is the cardinal

feature of the disease associated with Sandhishotha (Joint Swelling), Vata purnadruti Sparsha (Crepitus), and lack of movements of the joints or painful movement of the joints. In Ayurveda the study and diagnosis of diseases is done with the help of Nidanpanchak. The disturbances in Dosha, Dhatus and Mala manifest diseases. These disturbances in Dosha, Dhatus and Mala are assessed by kshaya, Vriddhi and Prakop lakshanas. If the imbalance of Dhatus is assessed with the help of Conventional Medicine in the form of Biochemical Parameters, it would be one objective diagnostic tool to confirm the clinical subjective parameters. The concept of Sthanastha and Margaga Dhatus can be elaborated by investigating Blood or Serum for respective Biological elements.

AIMS AND OBJECTIVES

Aim

To elaborate Margaga Dhatu concept in Sandhigatavata with special reference to Asthi Dhatu

Objectives

1. Conceptual exploration of Margaga Dhatu for clinical application.
2. Etiopathological study of Sandhigatavata.
3. Establishment of co-relation between Margaga Dhatu and Markers of bone pathology.
4. Development of Diagnostic and Prognostic parameters by investigating blood or serum for Margaga Dhatu.

MATERIAL AND METHODS

Patient Selection Criteria

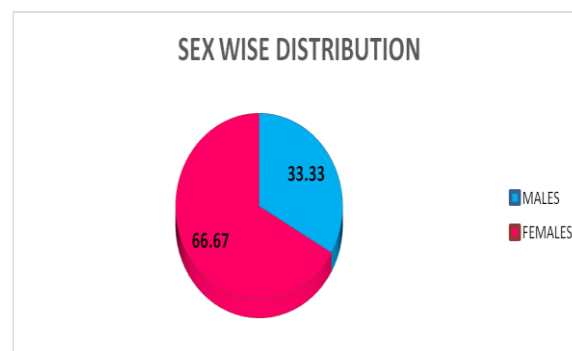
- **Inclusion Criteria:** Patients of Sandhigatavata who fulfilling the criteria of assessment with irrespective of age and sex were included.
- **Exclusion Criteria:** Traumatic arthritis, Rheumatoid arthritis, Gouty arthritis Syphilitic arthritis, Psoriatic arthritis, SLE, not willing for study were excluded from study.
- **Plan of Work**
 1. After detail review of literatures, scientific case record form and inform consent of subject was prepared.
 2. Patients of Sandhigatavata who fulfilled the criteria of assessment with irrespective of age and sex were selected for study.
 3. X-ray of Knee Joints of the patients was carried out to confirm the Sandhigatavata.
 4. The Blood samples of the patients were investigated for decided bone markers.
 5. Inference was drawn on the basis of findings of bone markers.
- **Place of Work:** D.Y.Patil School of Ayurveda and Hospital, D.Y.Patil University, Nerul, Navi Mumbai.
- **Sample Size:** 30 Patients.

OBSERVATIONS AND RESULTS

Demographic Data of the Patients

Table 1: Showing sex wise distribution.

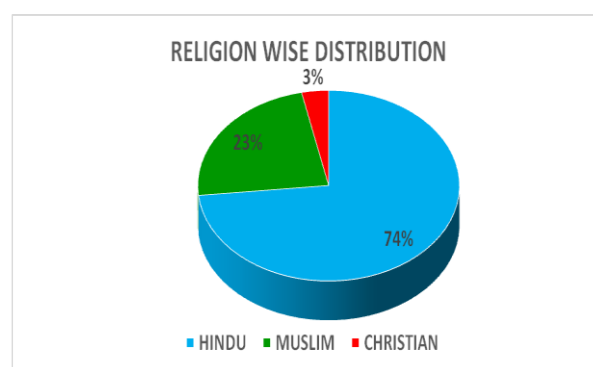
Sex	Percentage
Males	33.33
Females	66.67



Graph 1: Showing sex wise frequency Distribution.

Table 2: Showing religion wise distribution.

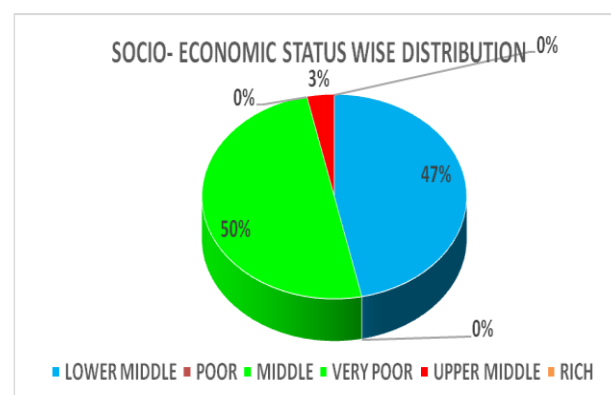
Religion	Percentage
Hindu	73.33
Muslim	23.33
Christian	3.33



Graph 2: Showing Religion wise frequency Distribution.

Table 3: Showing socio-economic status wise distribution.

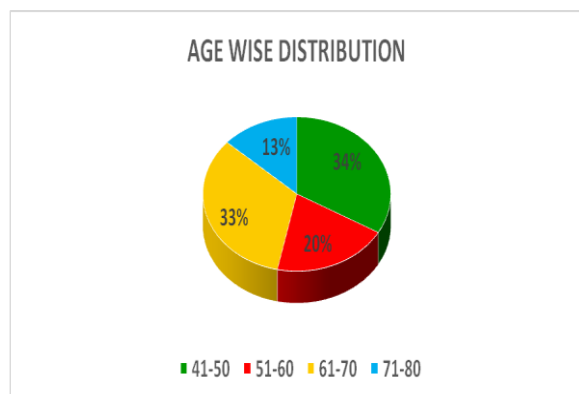
Socio-Economic Status	Percentage
Middle	50
Lower Middle	46.67
Upper Middle	3.33



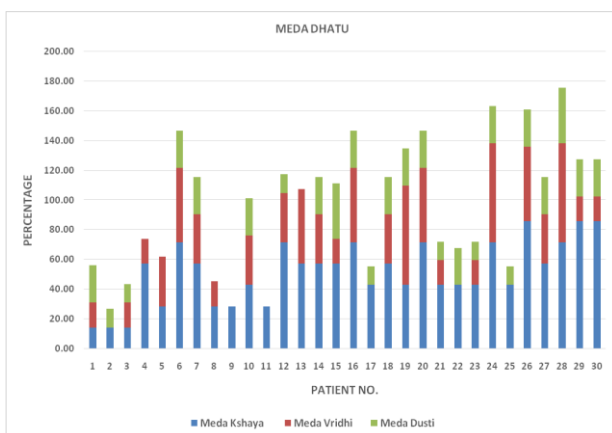
Graph 3: Showing Socio-economic status frequency distribution.

Table 4: Showing Age wise distribution.

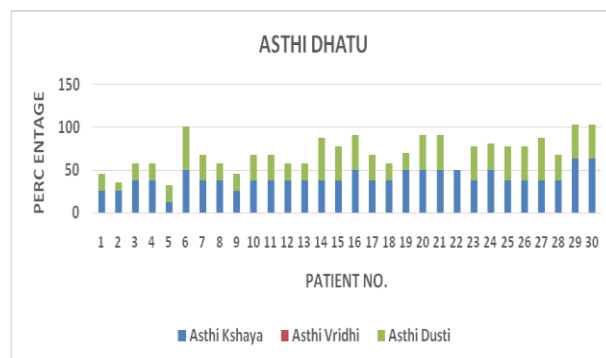
Age in Yrs	Percentage
41-50	33.33
51-60	20
61-70	33.33
71-80	13.33

**Graph 4: Showing Age wise frequency distribution.****Table 5: Showing Medadhatu Dushti Distribution.**

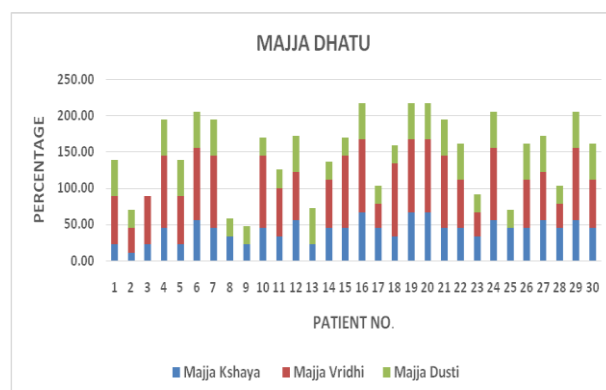
Meda Dhatu			
Number of Patients	Meda Kshaya	Meda Vriddhi	Meda Dushti
30	51.43%	27.78%	17.92%

**Graph 5: Showing Meda Dhatu Dushti frequency Distribution.****Table 6: Showing Asthidhatu Dushti Distribution.**

Asthi Dhatu			
Number of Patients	Asthi Kshaya	Asthi Vriddhi	Asthi Dushti
30	40%	0%	30%

**Graph 6: Showing Asthidhatu Dushti frequency distribution.****Table 7: Showing Majjadhatu Dushti Distribution.**

Majja Dhatu			
Number Of Patients	Majja Kshaya	Majja Vriddhi	Majja Dushti
30	42.22	66.67	38.33

**Graph 7: Showing Majjadhatu Dushti frequency distribution.****Table 8: Showing Complete Blood Count (CBC) Distribution.**

	Percentage of Complete Blood Count		
	Hb%	RBC	WBC
Less than normal	23.33	6.67	0
Normal	66.67	90	96.67
Greater than normal	10	3.33	3.33

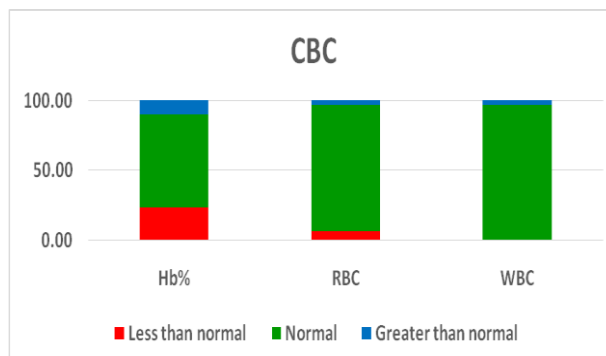
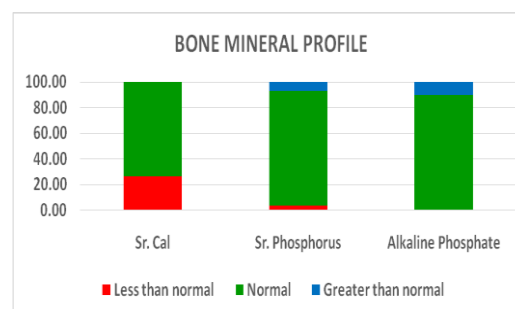
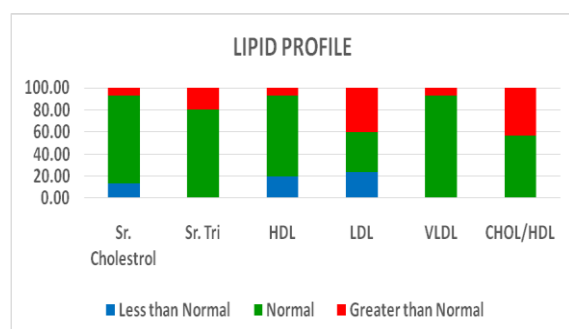
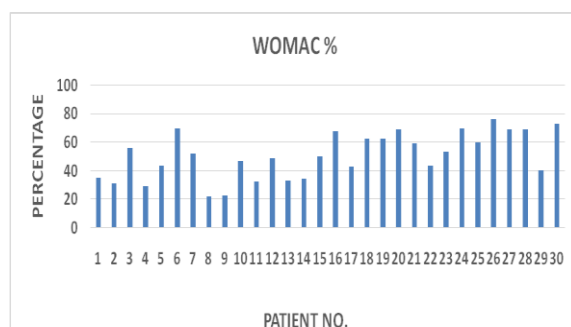
**Graph 8: Showing Complete Blood Count (CBC) frequency Distribution.**

Table 9: Showing Bone Mineral Profile Distribution.

	Bone Mineral Profile		
	Sr. Calcium	Sr. Phosphorus	Alkaline Phosphate
Less than normal	26.67	3.33	0
Normal	73.33	90	90
Greater than normal	0	6.67	10

**Graph 9: Showing Bone Mineral Profile Frequency Distribution.****Table 10: Showing Lipid Profile Distribution.**

	Lipid Profile					
	Sr. Cholesterol	Sr. Triglyceride	HDL	LDL	VLDL	CHOL/HDL Ratio
Less than Normal	13.33	0	20	23.33	0	0
Normal	80	80	73.33	36.67	93.33	56.67
Greater than Normal	6.67	20	6.67	40	6.67	43.33

**Graph 10: Showing Lipid Profile Frequency Distribution.****Graph 11: Showing WOMAC Scale Frequency Distribution.**

The different Parameters considered are tested using the Mann Whitney U Test and the unpaired t-test as we have divided our data into two groups of Upastambhita ($n_1=21$) and Nirupastambhita ($n_2=9$).

Table 11: Showing Womac Scale Distribution.

Patients Sr. No.	WOMAC SCALE %	Patients Sr. No.	WOMAC SCALE %
1	35.41	16	67.7
2	31.25	17	42.7
3	56.25	18	62.5
4	29.16	19	62.5
5	43.77	20	68.75
6	69.75	21	59.37
7	52	22	43.75
8	21.87	23	53.31
9	22.91	24	69.79
10	46.88	25	60.04
11	32.29	26	76.04
12	48.96	27	68.75
13	33.33	28	69.07
14	34.38	29	40.62
15	50	30	72.91

Following parameters were tested by applying the Mann Whitney U Test.

Parameter	U	U'	A	B	p-value	Significance
Meda Kshaya	63	126	357	108	0.1598	Not Significant
Meda Vriddhi	91	98	329	136	0.8917	Not Significant
Meda Dushti	45	143.5	374.5	90.5	0.0275	Significant
Ashti Kshaya	36	153	384	81	0.0082	Very Significant
Ashti Dusthi	68	121	352	113	0.2377	Not Significant
Majja Kshaya	44	144.5	375.5	89.5	0.0244	Significant
Majja Vriddhi	69.5	119.5	350	114.5	0.2656	Not Significant
Majja Dushti	80.5	108.5	339.5	125.5	0.537	Not Significant

Following Parameters Were Tested By Applying The Unpaired T Test.

Parameter	Mean (U)	Mean (N)	S.D. (U)	S.D. (N)	t-value	p-value	Significance
Serum Cholesterol	187.27	184.6	49.78	30.33	0.148	0.8828	Not Significant
Serum Triglycerides	137.61	114.29	61.85	24.16	1.087	0.2861	Not Significant
Serum Calcium	9.3	8.78	0.46	0.63	2.569	0.0158	Significant
Serum Phosphorous	3.72	3.72	0.58	0.46	0.01499	0.9885	Not Significant
Alkaline Phosphorus	103.7	97.48	21.07	32.25	0.6301	0.5337	Not Significant
WOMAC	56.8	37.03	12.78	14.83	3.702	0.0009	Extremely Significant

1. Hypothesis related with Serum Cholesterol and Upastambhita.

H₀: There is No Significant association between Serum Cholesterol and Upastambhita.

H₁: There is significant association between Serum Cholesterol and Upastambhita.

Decision Criterion: Reject H₀ if p- value is less than 0.05.

Applying the Chi-square test for association, we get p-value = 1

Which is greater than 0.05 and hence we do not reject H₁.

	Upastambhita	Nirupastambhita
Serum Cholesterol Normal	19	9
Serum Cholesterol abnormal	2	0
Total	21	9

2. Hypothesis related with Serum Triglycerides and Upastambhita.

H₀: There is No Significant association between Serum Triglycerides and Upastambhita

H₁: There is association between Serum Triglycerides and Upastambhita

Decision Criterion: Reject H₀ if p- value is less than 0.05

Applying the Chi-square test for association, we get p-value = 0.1405

Which is greater than 0.05 and hence we do not reject H₁.

	Upastambhita	Nirupastambhita
Serum Triglycerides Normal	15	9
Serum Triglycerides Abnormal	6	0
Total	21	9

3. Hypothesis related with Serum Calcium and Upastambhita.

H₀: There is No significant association between Serum Calcium and Upastambhita

H₁: There is significant association between Serum Calcium and Upastambhita

Decision Criterion: Reject H₀ if p- value is less than 0.05.

Applying the Chi-square test for association, we get p-value = 0.0318.

Which is less than 0.05 and hence we reject H₁.

I.e. there is association between Serum Calcium and Upastambhita

	Upastambhita	Nirupastambhita
Serum Calcium Normal	18	4
Serum Calcium Abnormal	3	5
Total	21	9

DISCUSSION

1. Discussion on Margaga Dhatu: In this present study, the Purvadhātu (Meda) and Utterdhātu have significant kshaya lakshanas. As per textual description if Purvadhātu is impaired that will not provide good nourishment to Utterdhātu. It is also observed that Meda, Asthi and Majja Dhatu were not maintained in equilibrium status. To solve the controversy, whether the process of Dhatuparinama takes place as a chain reaction or it is an aggregation of different reactions (i.e. according to which Nyaya, it takes place). Acharya Chakrapani has postulated the concept of Poshaka and Poshya Dhatus. Further the seven Dhatus can be classified into two types: - Sthayi (Poshya) and Asthaya (Poshaka) Dhatus. The Sthayidhatus are Dhatu proper, which stays constantly in the body right from birth to death. They are responsible for the support and maintenance of the body. Their increase or decrease depends on Asthayidhatus. The Asthayidhatus are the elements that are formed after Bhutagni paka. They are the specific nutritive homologues of the particular Dhatu. They circulate through specific Strotas and nourish specific Dhatus. The Sthayidhatus receive the nutrition

and convert them into similar body tissues by the help of specific Dhatwagni. Asthayi Dhatus are important for nutrition and to compensate the wear and tear phenomenon of the body.

2. Discussion on Sandhigata Vata: Sandhigatavata is the one commonest form of articular disorders. It is a type of Vatavyadhi comes under Nanatmaj vyadhi, which mainly occurs in Vruddhavastha (old age) due to Dhatu kshaya, which limits everyday activities such as walking, dressing, bathing etc., thus making the patient disabled / handicapped. It being a Vatavyadhi, located in Marmasthisandhi and its occurrence in old age makes it Kashtasadhya. Vata Dosha plays main role in the disease. Painful and restricted Joint movement is the cardinal feature of the disease associated with Sandhishotha and Vatapurnadruti Sparsha. Sandhigatavata is a one disease where all type of Margaga Dhatu and Sthanastha Dhatu gets disturbed. So it is well remarkable to study the concept of Margaga Dhatu and Sthanastha Dhatu in Sandhigatavata.

3. Discussion on Inter Relation of Margaga Dhatu and Bone Markers: As discussed above according to Ayurveda, there are two types of Dhatus i.e. Sthanastha and Margastha. Sthanastha Dhatus are Stable Dhatus which are present in the body since birth till death. These Stable Dhatus will grow to perform their function efficiently. Dhatus needs nutrition continuously & this nutrition is provided by Margastha Dhatus which are continuously moving in the body. Basically the good balanced diet is responsible to provide proper nutrition to all the Dhatus. From Poshaka Ahar rasa, Dhatu is produced first and then after other remaining Dhatus are produced. According to this Sthanastha and Margastha Dhatu concept, this Poshaka and Poshya axis is maintained in the body. At the same time according to modern science there are so many types of cells and tissues. These cells and tissues get their nutritional factors and perform their function properly. So bone is one tissue which makes the frame work of the skeleton of the body. This skeleton having more movements as compared to the other organs. The joints are one part of the body which are continuously in movement. Among the joints of the body, knee joint is one important joint which is known as weight bearing joint. So the degenerative changes of the bones are mostly seen in the knee joint. That's why osteoarthritis is developed first in the knee joint. There are so many bone markers which are having diagnostic and prognostic significance in a bone and joints disorders. In the present study we have used the following bone marker i.e. serum calcium, serum phosphorous, and serum alkaline phosphates. Among these three bone markers serum calcium is having significant decrease level. So serum calcium is one important mineral which is necessary for the strength and compactness of the bones. In the present study, the Upastambhita Sandhigatavata is more. When there is Margavarodha in the Strotas, calcium metabolism would not be placed properly. So sufficient calcium will not

provided to the bones. In the present study, under the lipid profile, there were not any significant changes, but instead of Meda kshaya and Meda Vriddhi, Meda Dushti is observed more, (i.e., p-value: 0.0275). This shows that when concerned Margaga Dhatu is impaired that will not provide proper nutrition to its Concerned Dhatu. As described above about the Meda and Asthi Dhatu, Majja Dhatu is disturbed (Majja kshaya). From the above discussion we can use the marker of the bone pathology to identify the vitiation of Margaga Dhatus and Sthanastha Dhatus. There is no single concept in modern medicine, equivalent to the Ayurvedic concept of Dhatuparinama. Still, it can be compared with various metabolic reactions taking place in our body. The anabolic (building up) and catabolic (Breaking down) pathways can have some resemblance with the Ayurvedic concepts of Prasadapaaka and Kittapaaka respectively. The forethought of our Acharyas seems evident in giving Dhatuposhana (building up) as well as Malaroopa (breaking down) attributes to the Doshas, parallel to the concept anabolic and catabolic changes in modern medicine. The main metabolic reactions taking place in our body are those of carbohydrates, proteins and lipids; which are very much interrelated also.

CONCLUSION

1. The various diagnostic markers according to modern science are to be applied to identify the vitiation of Margaga and Sthanastha Dhatu.
2. There is significant association between margaga Dhatu (Meda, Asthi and Majja) and bone minerals (calcium, phosphorous, alkaline phosphates).
3. The diagnostic markers of the blood and serum could be used as a diagnostic and prognostic parameter to understand the margaga Dhatu concept.
4. The concept of Margaga Dhatu and Sthanastha Dhatu could be elaborated in scientific manner with the help of constituents of Blood.
5. There is strong association between the Lakshanas of Meda Kshaya, Meda Vriddhi and Bone Minerals Profile.
6. Clinical Features of Dhatu Kshaya and Dhatu Vriddhi could be assessed in confirmative manner with blood markers.
7. Womac Scale is significant Remarkable in Sandhigatavata and Bone minerals.
8. This study would be useful to establish relation between other Dhatus and Blood Constituents.
9. The normalcy and abnormality of Margaga and Sthanastha Dhatu is directly proportional to each other.
10. By understanding the concept of Margaga and Sthanastha Dhatu, the equilibrium status of Doshas could be achieved and the further progress of the disease can be arrested.

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