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Pathophysiological understanding of Asthivaha Srotas Dushti WSR to the osteoarthritis and osteoporosis

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Abstract

The World Health Organization defines osteoporosis as "a progressive systemic skeletal disease characterized by low bone mass and microarchitectural damage of bone tissue, with consequent increase in bone fragility and susceptibility to fracture." Osteoporosis is considered a serious public health problem. According to the 2001 census, there are approximately 163 million Indians above the age of 50. This number is expected to increase to 230 million by 2015. Even conservative estimates suggest that 20% of women and about 10-15% of men should be osteoporotic. So the total affected population would be around 25 million, this number may increase up to 50 million. According to the classics, Asthi Kshaya has Lakshanas like Asthi Shoolam, Kesha, Loma, Nakha, Dwija Prapatnam, Sandhi Shaithilya. As some of the Lakshanas of Asthi Kshaya resemble the signs and symptoms of osteoporosis, it can be compared to osteoporosis to some extent.

Keywords: Asthikshaya, vata dosha, postmenopausal osteoporosis

Introduction

Ayurveda is an ancient science of life that deals with both preventive and curative aspects. He explains the human body as a "pleasant homeostasis" of Dosha, Dhatu and Mala. The function of Dhatu is Dharana Sharira^[1].

Osteoporosis is one of the main symptoms, which is increasingly perceived as a serious disabling disease in women over 40 who reach Rajonivrti. It is not mentioned as a disease in the classical texts of Ayurveda. Still, according to Acharya Sushruta it can be considered Swabhavabala Pravritta Vyadhi^[2]. Rajonivriti occurs in Sandhikala Praudhawastha and Jarawastha where Vata begins to overpower Pitta Dosha and leads to Kshaya of all Dhatus^[3]. According to the principles of Ashrayaashrayi Bhava by Acharya Vagbhata^[4] Asthi Dhatu is the seat of Vata Dosha^[5] and is indirectly related to each other i.e. if there is Vata Vruddhi there is Asthikshaya.

Asthikshaya arises due to two main mechanisms, the first is lack of nutrients suitable for bone nutrition due to malnutrition or catabolic activity of Vata Dosha and the second is Srotoavarodha which prevents the supply of nutrition to the Asthivahasrotas due to imbalanced Agni i.e. with Jatharagnimandhaya and Dhatwagnimandhaya resulting in creation of Ama. It can also occur as a result of a combination of both.

The World Health Organization defines osteoporosis as "a progressive systemic skeletal disease characterized by low bone mass and microarchitectural damage bone tissue with a subsequent increase in bone fragility and susceptibility to fracture^[6]". Low estrogen levels cause an imbalance in bone reabsorption and remodeling, leading to accelerated bone loss^[7].

Although most of the Samhita explained the Asthi Dhatu, its structure, function and various diseases, a detailed description about the Nidana Panchakas of the Asthikshaya is not available in our classics.

Considering the above factors in this study, an effort is made to understand the Nidana Panchak of Asthikshaya with special reference to postmenopausal osteoporosis.

Nidana**Samanya Dhatukshaya Nidana^[8]**

- Ativyayama (excessive exercise)
- Anashana (fasting)
- Ati Chinta (worry)
- Rukshashana (intake of dry food)

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- *Alpaashana* (intake of less food)
- *Vataatapa Sevana* (exposure to dust and sunlight)
- *Bhaya, Shoka* (excess of worry, grief, fear,)
- *Rukshapana* (intake of dry liquid like Ruksha Madya)
- *Prajagara* (waking at nights)
- *Ativartana (Atyadhika Pravrutti)* of *Kapha, Rakta, Shukra, Mala,*
- *Kala* (time factor (*Adana Kala* and *Vridhavasta*))
- *Bhutopaghata* (invasion of *Bhuta, Preta* etc.)

Asthivaha Srotodushti Nidana

- *Vyayama* (excessive exercise)
- *Ati Sankshobha* (excessive irritation)
- *Asthi Vighattana* (repeated trauma)
- *Vatala Ahara Sevana* (excessive consumption of *Vata* aggravating food)

Majjavahasrotodushti Nidana^[9]

- *Utpeshana* (being crushed)
- *Ati Abhishyandana* (being filled with wet components of *Kapha*)
- *Abhighata* (trauma)
- *Prapedana* (compressed)
- *Virudha Ahara Sevana* (consumption of incompatible and unwholesome food)

Purishava Srotodushti Nidana^[10]

- *Sandharana* (withholding urge of defecation)
- *Ati Ashana* (excessive eating)
- *Ajeerna* (indigestion)
- *Adhyashana* (repeated eating)
- *Durbalagni* (weak digestion)
- *Krusha* (in emaciated persons)

Medovaha Srotodushti Nidana

- *Avyayama* (lack of exercise)
- *Diva Swapna* (sleeping during day time)
- *Medhyanam Ati Sevanat* (excessive intake of fatty, fried and caloric foods)
- *Varuni* (an alcoholic product).

Vishishta Nidana Sahaja Nidana

- *Berea*,^[11] *Beejabhaga, Beejabhagavayava*
- *Pitrija Bhava*^[12]
- *Kulaja* (Caucasians)
- *Prakriti (Vata dominant Prakriti)*

Jataja Nidana^[13]: *Vatakara Ahara, Vihara*

Swabhavaja Nidana^[14, 15]: More in women and old age

Samprapti

Acharayas mentioned Ashrayaashrayi Bhava which beautifully explains the relationship of different Doshas with Dhatus. According to this theory, Vata Ashrayi is Asthi Dhatu and only these two shares a reciprocally proportional relationship. Due to this special relationship, all Vata Nidana becomes Nidana for Asthi Kshaya. Keeping in view all the Nidans explained under Vata Vyadhi an attempt has been made here to formulate and explain the Samprapti Asthi Kshaya. To have a proper interpretation of Samprapti Asthi Kshaya, apart from the normal Vata Prakopa Nidana, the main factors for the materialization of the disease, the Srotopradusaka Nidanas of Medovaha, Asthivaha, Majjavaha and Purisavaha Srotas should not be neglected as they also play some role either directly or indirectly in the pathogenesis

of Asthi Kshaya. Proper functioning of Jataragni, Bhutagni, Dhatwagni is necessary for "Samyak Dhatu Posana Prakriya"^[16] to maintain qualitative and quantitative normality of Dhatus while explaining the concept of Dhatu Utpatti.

A functional distortion in any of these Agnis, especially Dhatwagni, leads to Vikruti in the transformation of Posaka Dhatu (Dhatu-specific nutrients) into Posya or Sthayi Dhatu, leading to Dhatuvikruti. So adaptation of Dhatu Posana Krama principles is also done in this regard to explain the Samprapti of Asthi Kshaya.

Manasika factors also play a vital role in the pathogenesis of Asthikshaya. The role of manas in the causation of disease is very well explained in our classics. Thus, these factors are also considered effective in explaining the samprapti of Asthikshaya. Considering the above factors, it is found that the pathogenic mechanism of Asthikshaya is not a single mechanism whereas it is a complex mechanism.

Samprapti Ghataka of Asthikshaya

Dosha: *Vata Pradhana (Vyana, Udana, Samana), Pitta (Pachaka), Kapha (Kledaka, Shleshaka)* Vata is the leading dosha as it is a disease related to *Jara* and *Asthi Dhatu*. Also, when vata is provoked, *Kapha Kshaya* occurs. *Vata Prakopa* and *Kapha Kshaya* show symptoms like *Shoola, Rukshata, Ruja, Shrama* etc.

Dushya: Asthi is the main Dushya in this disease with its Mala, Nakha and Kesha. But Kshaya of all Dhatus also occurs in later stage i.e. all Dhatus including theirs Upadhatus can be considered as Dusya.

Agni: In old age, *Jatharagni Vaishamya* leads to poor *Dhatu* formation, by affecting *Dhatvagni* and *Bhutagni*.

Ama: *Jatharagnijanya Ama* and *Dhatvagnijanya Ama*

Srotas: *Medavaha, Asthivaha, Majjavaha, Purishavaha Srotas*.

Sroto Dushthi Laxshana: *Sanga*.

Udbhava Sthana: *Ama Pakwashaya*.

Sanchara Sthana: *Rasayani*.

Vyakta Sthana: *Asthi Dhatu, its Upadhatu Danta* and *Mala Kesha, Nakha, Roma* and *Sandhi*.

Adhithana: *Asthi* and *Sandhi*.

Roga Marga: *Madhyama Roga Marga*.

Roga Prakriti: *Chirakari*.

Purvarupa

When we go through the classics we cannot find Poorvarupa of Asthikshaya. Vatavardhaka Nidana along with other Nidana itself forms Nidana for Asthikshaya due to Ashraya Ashrayi Bhava of Vata and Asthi. So Vridhdhavata causes Asthi Kshaya disease. As we all know Poorvarupa in Vatavyadhi is Avyakta. Chakrapani clarified in his commentary that Avyakta can be taken as Alpavyaktata or as Asampoornalakshana or as mild Lakshana. So Lakshana in their mild form can be considered as Poorvarupa of Asthikshaya in the initial stage of the disease. Manda Vedana

(dull aching type of pain) in Asthi, Sandhi and Mildness of other Lakshana like Kesha, Roma, Nakha, Danta Vikara

(Shadana and Bhanga) can be considered as Purvarupa of Asthikshaya disease.

Rupa

Table 1: Different kinds of *rupas*

S. No.	Lakshanas	Ch	Su	A.S	A.H	H.S
1.	Asthibheda	+	-	+	-	-
2.	Asthitoda	-	+	+	+	-
3.	Ruja	-	-	-	-	+
4.	Asthi Shula	+	+	-	-	-
5.	Kesha Vikara and Patina	+	-	+	+	-
6.	Loma/Roma Vikara and Patana	+	-	+	+	-
7.	Nakha Vikara and Patana	+	+	+	+	-
8.	Smashru Vikara and Patana	+	-	-	-	-
9.	Danta Vikara and Patana	+	+	+	+	-
10.	Shrama	+	-	-	-	-
11.	Sandhi Shaitihilya	+	-	+	-	-
12.	Ruksha	-	+	+	-	-
13.	Parushya	-	-	+	-	-
14.	Asthibadda	-	-	+	-	-
15.	Mamsabhilasha	-	-	+	-	-
16.	Anga Bhanga	-	-	-	-	+
17.	Ati Manda Chesta	-	-	-	-	+
18.	Bala Kshaya	-	+	+	+	-
19.	Medo Kshaya	+	-	-	-	+
20.	Viryasya Mandya (Utsaha Hani)	-	-	-	-	+
21.	Vikampana	-	-	-	-	+
22.	Vamana	-	-	-	-	+
23.	Visangnata	-	-	-	-	+
24.	Shosha	-	-	-	-	+
25.	Kathorata	-	-	-	-	+
26.	Shophita	-	-	-	-	+

Upashaya

1. Shali, Rakta Shali, Masha, and another Madhura Rasa Pradhana Dravyas.
2. Lavana Rasa Pradhana Dravya with Amla.
3. Ghrta, Takra, Dadhi, and Dugdha.
4. Four. Mamsa, Mamsa Rasa, etc.
5. Five. Niyamita Vyayama.
6. Swedana and Abhyanga.
7. Vedana Shamaka Oushadhi and Vata Nashaka.

Anupashaya

1. Adhaki, Kalaya, Mudga, Masura, Shushka Shaka, etc.
2. Madya.
3. Sahasa, Ati Vyayama, etc.

Sadhyasadhyata

Asthi is at a deep location, or Gambhira Dhatu. Yapya or Kashta Sadhya is supposed to be the sickness of Gambhira

Dhatu [17]. Because it occurs in Jarawastha, the illness Asthikshaya is also known as Asadhya. Additionally, when the ailment Asthikshaya manifests in bhedawastha, or the last stage of Kriya Kala. Whereas if the illness is cured, it remains Yapya; nevertheless, if it is not, it transforms into Asadhya [18].

Upadrava

If the condition is not effectively managed, it may result in further Dhatu Kshaya, such as Majja Kshaya, Shukra Kshaya, and other Dhatu Kshaya leading to Bala and Oja Kshaya. The most frequent Upadrava of Asthi Kshaya is Asthi Bhagna (fractures), which are caused by Asthi Dhatu's loss of normal texture, strength, and density. The fractures are the primary risk factors for osteoporosis, according to contemporary science.

Pathya-Apathya

Table 2: Different kinds of *pathya-apathya*

S. N.	Varga	Pathya	Apathya
1.	Rasa	Madhura-Amla- Lavana	Katu-Tikta-Kashaya
2.	Shukadhanya	Nava Godhuma, Nava Shali, Rakta Shali, Shashtika Shali	Rajamasha, Nishpava, Mudga, Kalaya
3.	Shimbi Varga	Nava tila, Masha, Kulattha	Truna, Koradusha
4.	Shaka Varga	Patola, Shigru, Vartaka, Lashuna	Jambu, Udambara, Kramuka, Tinduka
5.	Mamsa Varga	Ushtra, Go, Varaha, Mahisha, Mayura, Bheka, Nakula	Shushka Mamsa, Kapota, Paravata
6.	Jala Varga	Ushnajala, Shritasheetajala	Sheetajala
7.	Dugdha Varga	Go, Aja, Dadhi (Svadu Dadhi and Amla Dadhi, curd prepared from buffalo milk), Ghrta, Kilata	-
8.	Mutra Varga	Gomutra	-
9.	Madhya Varga	Dhanyamla, Sura	-
10.	Sneha Varga	Tilaja, Ghrta, Vasa, Majja	-
11.	Vihara	Veshtana, Trasana, Mardana, Snana	Ratri Jagarana, Ativyayama, Adhika Shrama, Ativyavaya, Ati Chankramana, Vegadharana
12.	Manasika	Sukha	Atichinta, Atibhaya, Atishoka

Osteoporosis**Etymology**

Osteoporosis is derived from Latin.

Osteon - bone; Porosis – porous Hence it means porous bones.

Definition

World Health Organisation defines osteoporosis as a “progressive systemic skeletal disease characterized by low bone mass and micro architectural deterioration of Classification of Osteoporosis Primary Osteoporosis

1. Post-menopausal: Type I
2. Age related: Type II

Secondary Osteoporosis**Endocrine**

Cushing’s syndrome

- Thyrotoxicosis
- Hypogonadism
- Pituitary insufficiency
- Athletic amenorrhoea

Drugs

- Corticosteroids
- Long term heparin use
- Anticonvulsant drugs
- Cytotoxic drugs

Inherited

- Turner’s syndrome
- Osteogenesis imperfecta
- Homocystinuria

Nutritional

- Anorexia nervosa
- Alcoholism
- Malabsorption syndrome

Immobility

- General (lack of weight bearing exercises)
- Local (e.g. rheumatoid arthritis, hemiplegia, fracture)

Other (rare)

- Chronic hepatic disease
- Juvenile bone tissue, with a consequent increase in bone fragility and susceptibility to fracture”. Pregnancy
- Masto cytosis

Postmenopausal Osteoporosis Mechanism of Estrogen Effects on Bone

A number of data in the reproductive stage showed that estrogens may have an impact on bone mass prior to the menopause. In certain research, premenopausal women's bone mass and parity were found to be positively correlated [19]. Additionally, albeit not consistently across studies, the use of oral contraceptives has been linked to greater bone density in certain women. In premenopausal women, a number of hypo-estrogenic conditions are linked to decreased bone mass. Amenorrhea is linked to decreased bone density and an increased risk of fractures in female dancers and sports. There is yet little understanding of how estrogen affects bone turnover. However, other theories have been put forth. Both genomic and non-genomic activities may be used by estrogen to affect the skeleton.

Calcitonin theory

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Estrogen receptors theory

The estrogen receptor (ER) has two primary subtypes, ER and Er. In human bone, both receptor subtypes have been found. According to recent research, ER predominates in cortical bone while ER predominates in cancellous bone. Osteoclasts, osteoblasts, and osteocytes—the three primary kinds of bone cells—have all been identified as having estrogen receptors. Several cytokines and growth factors that are involved in the control of bone remodeling are produced as a result of estrogen's actions. Estrogen has a bone-preserving impact that is mostly mediated by how it affects osteoclast activity and number. Lack of estrogen in postmenopausal women is linked to higher levels of interleukin 1 (IL-1), IL-1 and TNF also promote osteoclastic activity, as do tumour necrosis factor (TNF) and granulocyte macrophage colony stimulating factor (GM-CSF), cytokines that accelerate osteoclast formation. Interleukin-6 (IL-6) synthesis is also inhibited by estrogen, and more recently, it has been demonstrated that osteoprotegerin production in osteoblastic cells is stimulated by estrogen. For the cytokine RANKL (receptor activator of NF-B ligand), which is crucial for osteoclast formation, osteoprotegerin serves as a soluble decoy receptor. Estrogen effects on osteoclast activity are also mediated through apoptosis activation. Osteoclast apoptosis has been demonstrated to be inhibited by IL-1, IL-6, and M-CSF, whereas transforming growth factor (TGF), whose synthesis is reduced in estrogen-deficient situations, increases apoptosis. Thus, the loss of estrogen at the menopause results in accelerated bone loss and is a major pathogenic factor in postmenopausal osteoporosis.

Signs and Symptoms

Osteoporosis is a silent disease, until a fracture is sustained.

Clinical Findings

- In early stages, following acute thoracic compression fracture, patients exhibit marked discomfort on sitting and standing.
- Gait is normal but slow. Spinal movements considerably reduced, with more restriction in flexion than in extension.
- Dowager’s hump (thoracic kyphosis) may be present as a result of previous anterior compression fractures.
- Involvement of lumbar spine is noted by progressive loss in lumbar lordosis.
- Axial height may be decreased.
- Paravertebral muscle spasms are palpable and often visible. Spine and paravertebral muscles are tender on palpation and percussion over the level of fracture.

- Bony point tenderness is usually absent as the fracture is in the anterior vertebral body of spine which are not palpable.
- Most patients are totally pain free during the intervals between compression fractures; whereas some may complain of chronic, dull, aching postural pain in mild thoracic and upper lumbar region. This responds symptomatically to frequent, intermittent horizontal rest.
- Loss of height may be up to 2 to 4 cm with each episode of segmental vertebral collapse and progressive kyphosis.
- There is no significant loss of height when the lower ribs come to rest on iliac crest due to collapsed spine., yet loss of bone mass continues.
- This result in decrease in size of thoracic and abdominal cavities, which are responsible for clinically disturbing side effects – exercise tolerance is reduced.
- Abdominal distention, protrusion is a common manifestation secondary to severe lumbar vertebral collapse.
- Circumferential pachydermal skin folds develop at the rib and pelvic margins as the disease progresses.

Measurement of Bone Mass or Bone Mineral Density (BMD)

One of the advancements in osteoporosis that has led to greater patient awareness of this condition is the clinical application of bone densitometry. A physician can use bone densitometry to diagnose osteoporosis before the first fracture occurs, as well as to forecast fracture risk in postmenopausal women, males, and patients taking glucocorticoids. Three reasons clinicians do bone mineral density measurements are

1. Diagnosis using the WHO criteria for Osteoporosis.
2. Fracture risk prediction, and
 - Monitoring the natural progression of diseases that affect BMD or monitoring the therapeutic response to Osteoporosis specific treatments.
 - T scores between -1 and -2.5 represents osteopenia, clinical significance of which is not completely understood.
 - 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.

Treatment of Osteoporosis

Modern research accepts "Prevention Is Better than Cure" as the key management strategy for osteoporosis. Medical intervention is only required when the disease manifests and begins to raise the risk of consequences, posing a threat to the patient's life.

Prevention

R Handa claims in his orthopaedics textbook The best ways to prevent osteoporosis include engaging in regular physical activity, eating a diet rich in dietary calcium, magnesium, phosphorus, and other minerals, getting enough vitamin D from the sun, abstaining from tobacco and alcohol use, and avoiding prolonged use of certain medications like corticosteroids, anticonvulsants, heparin, and other similar ones.

Discussion

Nidana

The Asthikshaya Nidana or the causes of AsthiKshaya are not specifically mentioned in the classics. However, the Ashrayaashrayi Bhava, which is described in our classics, provides a magnificent explanation of the link between Asthi Dhatu and Vatadosha. This theory holds that Asthikshaya happens when Vata grows and vice versa.

With this idea in mind, we may argue that the Nidana that causes the Vata Dosha to rise also causes the Asthi Kshaya. Rajonivrittijanya Avastha also frequently exhibits a number of Jarawastha symptoms. Rajonivritti might therefore be defined as a component of the aging process that is unique to women. *Akalaja Jara (Rajonivritti)*, *Ruksha Ahara Sevana* for lifetime, sedentary life style, and low intake of *Asthi Posaka Amsa* in diet serves as *Nidana of Asthi Kshaya*.

Asthivaha, Majja Vaha, and Purisha Vaha Srotas as well as factors affecting Jatharagni, Bhutagnis, particularly Parthivagni, Vayuvyagni, and Tejasagni, as well as both Upachayakaraka and Apachayakaraka Asthi Dhatwagnis, are other causes of Asthi Kshaya.

Functional malformation in any of these Agnis, particularly the Dhatwagni, causes Posaka Dhatu to change into Poshya or Sthayi Dhatu, which results in Dhatuvikrti. In order to explain the Samprapti of Asthikshaya, the Dhatu Posana Krama principles are thus also applied in this case.

Discussion on Samprapti

Samprapti of Asthikshaya is not a single pathogenic mechanism whereas it is a complex mechanism. Hence Samprapti Asthi Kshaya is explained under two different headings Samanya Samprapti and Vishesh Samprapti.

According to Acharya Charaka, Avruta Marga of Vata causes it to become Prakupita and causes Rasadi Dhatu Shoshana. Obstruction of normal Gati Vata (Vyana Vata) occurs due to Margavarana. This affects the functions of ahara rasa viksepa (rasa samvahana), dhatu vyuhana and agni samirana functions of vjana Vata. As a result Ahara Rasa containing posakamsas to Dhatus will not be able to reach and nourish Sthayi Dhatus, Dhatu Vyuhana i.e. specific arrangement and permeability of posakamsas within Sthayi Dhatus will not be possible and functions of Dhatwagnis are also affected. This signifies the importance of Medodhatvagni. Vitamin D, which is obtained from sterols, is necessary for the absorption of calcium in the body. Therefore, Moola of Asthi Vaha Srotas is rightly considered as Honey. Imbalance in Asthi Dhatvagni leads to improper formation of Sthayi Asthi Dhatu from Poshak Asthi Dhatu. Parathyroid hormone, calcitonin, estrogen, etc. play a significant role in bone metabolism. All these can be classified under the types of Agni operating at different levels. The relationship of Ashrayaashrayi Vata Dosha and Asthi Dhatu forms the basic basis for understanding any pathological condition related to Asthi Dhatu.

As a combined effect of these factors, Dhatu Kshaya occurs. According to the principles of Ashrayaashrayibhava explained by Acharya Vagbhata, Asthi Dhathu is the most fictitious to influence among Saptha Dhatu because Vata and Asthi are inversely proportional. In short it can be said that Asthikshaya is caused by Dhathu Kshaya Karaka and Maragavarana Karaka, Nidana Sevana causes Prakupita Vata to fill Riktatata in Astivaha Srotases which are barren Snehadi Gunas and cause Asthikshaya.

Poorva Roopa

We are all aware that Avyakta is the Poorva Roopa in Vata Vyadhi. Avyakta can be consumed as Alpa Vyaktata, Asampoorna Lakshanas, or mild Lakshanas, according to Chakrapani's commentary. In a milder form than Asthishula, Toda, Bheda, Shrama, Sandhishaitilya, Danta Shadana, Nakha Shadana, and Danta and Nakha Bhanga emerged.

Rupa

Along with the Laxanas of Asthadasa (18 sorts), it was referenced by Acharya Caraka. Along with the Laxanas of Kshaya (Rajyakshma), the Laxanas of Asthikshaya are detailed in the Harita Samhita. Due to the Asrayasrayi Bhava, Pravrudha Vata Dosha is the primary cause of Asthi Kshaya. Therefore, the Vata Vriddhi is the cause of the Laxanas, which is why different kinds of Vedanas may be seen in the Asthis and Sandhis. Due to the fact that the Dhātu metabolism involves two Pakas, Prasada Paka and Kitta Paka, when the Dhatus are harmed, the Upadhathu and Malas are typically also impacted concurrently. The Prasada Paka and the Kitta Paka are inevitably impacted by a malfunction in Dhātu metabolism due to an inadequate supply of nutrients, which results in the Vikaras of Dhātu.

Conclusion

Asthikshaya is a crippling disease that renders women bedridden for life. The prevalence of postmenopausal Asthi Kshaya is more in people above 40 years of age. Peak bone mass is reached at the age of 30. Asthikshaya is one of the Swabhavabala Pravrutta Vyadhi as in this Vaya (Vridhdhava) plays a major role along with Vata as Pradhana Dosha and Asthi as Pradhana Dhātu. An analysis of the textual references regarding the etiology of Asthikshaya reveals the fact that Vatakarā Nidana plays a significant role in the manifestation of Asthikshaya. It is concluded that any abnormalities in Vyāna Vata, Udana Vata, Samana Vata Pachaka Pitta, Shleshmaka Kapha, Kledaka Kapha and Aharaja, Viharaja Nidana result in Asthikshaya. There is no textual reference regarding the Purvarupa of Asthikshaya, so the Laxanas of Asthikshaya, when expressed in mild nature, are taken to be the Purvarupa of Asthikshaya. Laxanas of Asthikshaya are Asthishula/Toda/Bheda, Sandhi Shaithilya, Shrama, Danta Keshha Nakha Prapatana, Danta Bhanga, Nakha Bhanga. These Lakshanas have a close resemblance to the symptoms of postmenopausal osteoporosis in modern science, which include back pain, spinal deformity, risk of fractures. Madhura Rasa Pradhana Dravya like Shali, Rakta Shali, Masha etc., Amla and Lavana Rasa Pradhana Dravya, Dugdha, Dadhi, Takra and Ghrta, Mamsa, Mamsa Rasa, Niyamita Vyayama, Abhyanga and Swedana, Vata Nashaka and Vedana Shamaka Oushadhi are said to be Upashayas Asthikshaya. Majja Kshaya, Shukra Kshaya, Oja Kshaya and fractures - Anga Bhanga should be considered as a complication of Asthi Kshaya.

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