An Ayurvedic Approach towards Asthi-Kshaya with Special Reference to Postmenopausal Osteoporosis

*Dr. Vibha Sood, **Prof. K. L. Meena, ***Late Dr. Govind Pareek

*Assistant Professor, Dept. of Basic Principles, Mai Bhago Ayurvedic College, Muksar, Punjab,  
** Professor & H.O.D., *** Assosiate, Dept. of Basic Principles, National Institute of Ayurveda, Jaipur

ABSTRACT

In present era where population is growing very fast, struggle to survive for basic needs have become very tough. People are being more materialistic and ambitious neglecting their health issues. Due to their irregular daily routine and dietary habits, life style disorders have become very common now. Osteoporosis is one among them. It is a metabolic disorder, in which bones become thin, weak and fragile and more likely to break down eventually. In women, after menopause due to hormonal insufficiencies tendency to fall into osteoporosis is very high.

In Ayurveda, the disease is not mentioned as such by name; but signs and symptoms of Asthi-Kshaya are found very similar to osteoporosis. Asthi-Kshaya is mentioned as a Vata related disorder because aggravation of Vata is a main cause of Asthi-Kshaya. In Charak Samhita, the categorical principle of treatment is mentioned as, “Samanagunabhysos Hi Dhatunaam Vruddhi Karanam”. According to it, things, which contain similar properties to a particular Dhatu of body, can be helpful to increase that one Dhatu if they are used in a practice. So the Aushadh, Ahara and Vihar having similar properties to Asthi Dhatu, can be very effective to promote bone cells in body.

Keywords: Ayurveda, Asthi-Kshaya, Postmenopausal Osteoporosis, Rajonivruttijanya Asthi-Kshaya

Address of Correspondence:
Dr. Vibha Sood  
Dept. of Basic Principles,  
Mai Bhago Ayurvedic College, Muksar, Punjab  
Email ID: drvibhasood@gmail.com  
Contact No: 8742093129

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Introduction:

Ayurveda is the most ancient healthcare system in the world that unites the profound thoughts of medicine and philosophy. It is the science of life and longevity with the aim of prevention of disease, rejuvenation of our body system, and extension of life span. In modern era, where survival for basic needs have become very hard,
people are neglecting their health care and daily routine. So today, life style disorders have become very common. Among them osteoporosis is one of the growing health problem. It is a metabolic disorder. World health organization defines osteoporosis as a “progressive systemic skeletal disease characterized by low bone mass and micro architectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture”. Osteoporosis, the term is given by Pommer; which means porous bones. Due to Osteoporosis bones become thin, weak and fragile and more likely to break. It is called a silent disease because it can develop gradually over many years without causing any symptoms.

Although the disease affects both men and women but women suffer from it in majority due to their genetic phenomena. Women are at greater risk for osteoporosis after menopause.

A major cause behind it is that women’s bodies produce less oestrogen after menopause and oestrogen hormone plays an important role to prevent the bone loss. Hence, older women have a much higher rate of osteoporosis than younger women. In Ayurveda, old age is considered prone to Vata related disorders. Vitiation of Vata is said responsible for producing 80 types of disorders. Many of them are related to bones. This is because of the unique relationship between Vata and Asthi, called Ashraya- Ashrayi Bhava. In Charak Samhita, the categorical principle of treatment is mentioned as, “Samanagunabhyaso Hi Dhatunaam Vruddhi Karanam”. According to this principle, the things which contain similar properties to a particular Dhātu in body, can be helpful to increase that one Dhātu, if they are used in a practice. So the Aushadh, Ahara and Vihara having similar properties to Asthi Dhatu, can be very effective to promote Asthi Dhatu in body.

Methods:

(Present study has Ethical Clearance No F10 (5)/ EC/ 2014/ 7225)

In Ayurveda, Nutrition of the body is explained in the form of proper formation of Dhatus. By taking proper diet regimen these Dhatus remain in their balanced condition. In process of Sapta Dhatu Nirmana, the nutritive part of Rasa contributes nourishment to Rakta, Rakta to Mamsa, Mamsa to Meda, Meda to Asthi, Asthi to Majja and Majja finally provides nourishment to Shukra. Garbha (foetus) derives from Prasada Bhaga of Shukra. But when proper dietary regimen is not followed, it results into Kshaya of all Dhatus. Asthi-Kshaya is one among them. Total 18 types of Kshaya are described in classics.

The word Asthi is derived from As+ Kthin that means ‘to throw’, ‘to stay (Shabadakalpadruma). Acharya Charaka has mentioned that after digestion by Medagni, Prithvi, Agni and Anil Mahabhuta become dominant in Meda Dhatu. So now it turns into Khara Roopa (hard and rough) and is called Asthi Dhatu. Further Asthi too is digested by its own Agni and produces waste portion in the form of Kesha, Loma, Shmashru, large portion of Asthi itself and a small portion of next one Dhātu called Majja. Vayu creates porosity into bones and this porous space is further fulfilled by Meda Dhatu. (Ch. Su. 26/10), Asthi Dhatu is also not an exception. But Prithvi Mahabhoota constitutes a large portion of it that makes it the hardest and strongest Dhātu. There are two causes for vitiations of Asthivaha Srotas; one is excessive exercise causing friction and inflammation of bones and second one is intake of food that aggravates Vata.

Poorvarupa of Asthi- Kshaya:

The Poorvarupa of Vata Vyadhi can be considered as Purvaroopa of Asthi- Kshaya that remain in ceased form and it is the unique feature of Vata.

Rupa (Sign & Symptoms) of Asthi- Kshaya:

Falling of hair, nails, hair of beard as well as moustaches, teeth, fatigue and looseness of joints are the signs and symptoms found in Asthi- Kshaya. 

Chikitsa Sutra for Asthi- Kshaya:

"Samangunabhyaso Hi Dhatumam Vriddhi Karanam..."

This principle denotes that the things having similar
qualities to particular Dhatu, when are used constantly, cause enhancement of that particular Dhatu. Also it is mentioned in classics that similarity of all substances is always the cause of increase and dissimilarity the cause of decrease. Both effect by their application.

Asthikshaya is found naturally while aging starts but in postmenopausal women its occurrence is earlier.

**Rajonivritti**

The term 'Rajonivritti' is made up of two separate words viz. "Rajaḥ" and "Nivritti" which means cessation of menstrual blood. According to Sushruta and various other references too, 50 years is mentioned as the age of Rajonivritti, when the body is fully in grip of senility.

**Rajonivrittijanya Asthi-Kshaya**

Rajonivritti is mainly a stage of Jaravastha. Aging confers Kshaya of all Dhatus due to dominant Vata Dosha. Acarya Charaka admitted occurrence of Jaravastha from the age of sixty while Sushruta considered it at the age of forty. It is a natural event of human’s life. It can be considered under Kala and Svabhava. But when its onset occurs unduly it is classified under a disease. Vata Vriddhi results into much decrease of Asthi Dhatu due to Ashraya-Ashrayi Bhava. The possible etiopathogenesis for Rajonivritti-Janya Asthi-Kshaya can be discussed as under:

**Nidana:**

1. **Sahaja Nidana:**

   A. Vitiation of Beeja, Beejahaga, Beejabhagavayava: It may lead to weak and disease prone Asthi Dhatu in the progeny.

   B. Pitrija Bhava: Pitrija Bhava is responsible for formation of Asthi Dhatu. Therefore Pitrija Bhava Dushti can be a cause of improper Asthi Dhatu Nirmana.

   C. Prakriti: Vata dominant Prakriti is prone to develop the disease.

2) **Jataja Nidana:**

   Due to Ashrayashrayi Bhava, factors, which aggravate Vata Dosha certainly affect Asthi Dhatu. Ahara and Vihara which aggravate Vata, lead to imbalance of Asthi Dhatu proportion in body.

   **A. Ahara (Dietary factors):** Excessive intake of food having Ruksha Laghu, Sheeta, Vishad, Chala Gunas cause aggravation of Vata, excessive intake of Katu, Tikta, Kashya Rasa, Anashana, Alpashana, Pramitashana, less intake of Snigdha, Guru Gunas Ahara and Ksheera Dravya like Ksheera, Ghrita, Navneeta etc. or Rasayana Dravyas, Ama Doshotpatti in Shareera by Vishamagni.

   **B. Vihara:** Improper routine is considered here. As: Langhana - Plavana- Adhvakamana- Ativyayama- Ativicheshta- Ayyayama- Divaspapvapna-Dukh-Shaiyasana, Sheeghrayana- Atiprajagaraṇa- Patana- Abhighata- Marmaghata- Chinta-Shoka- Krodha- Bhaya- Visham- Upachara, Dosha- Asrikasravana- Vyavaya- Rohitakarshana

3. **Svabhavaja Nidana:** Postmenopausal osteoporosis is peculiar in women due to women's genetically low bone mass than men. In Ayurvedic texts too, references regarding to this are given at various places. Following special characteristics of women contrary to men given in classics, are considered under Streekara Bhava.

   1. **Samhanana:** Samhanana is measured by proper distribution of Asthi Dhatu (quality and quantity wise).While Asamhanana is absence of solidity or Dridhatva. So it is clear that Dridhatva is a function of Asthi Dhatu and it is not found proper in women.

   2. **Shaithlya** indicates looseness of joints and other body parts.

   3. **Mardava** denotes softness of all body parts.

   4. In Dantajanmik Adhyaya Acharya Kashyapa has explained the features of Danta in Kumari(female child) and Kumara (male child). Teething in girls is not as painful as in boys because teeth in girls are naturally Mridu and Sushira in constitution, All
these facts show that *Asthi Dhatu* is naturally weak in women as compared to men. Therefore, in women after *Rajonivritti*, where *Kshaya* of all *Dhatus* becomes fast, *Asthi Dhatu* is markedly affected because of already having weak constitution of it.

4) *Jara*:

During *Jaravastha* aggravation of *Vata* and *Dhatu Kshaya* are natural event. So the degeneration in bones also occurs.

**Samprapti Ghataka of Postmenopausal Osteoporosis:**

**Dosha:**

*Rajonivritti-Janya Asthi- Kshaya* is a disease concerned to *Jaravastha* and *Asthi Dhatu* hence *Vata Dosha* is a primary cause for its occurrence. Simultaneously *Kshaya* of *Kapha* occurs along with it. So the symptoms related to *Vata Prakopa* and *Kapha Kshaya* show like *Shoola, Raukshya, Ruja, Shrama* etc.

**Dushya:**

This disease is related to *Asthi* and its *Mala, Nakha* and *Kesha*. Among them *Asthi* is a main place affected by it.

**Srotas:**

*Asthivaha Srotas* get affected. So *Poshakansha of Asthi Dhatu* is not supplied to *Asthi Dhatu* through *Asthi Vaha Srotas*.

**Agni:**

In *Jaravastha*, due to vitiation of *Jatharagni*, formation of *Dhatu* does not occur because *Jathargni* affects both *Dhatvagni* and *Bhootagni*. *Agni* is *Vishama* in this period.

**Roga Marga:**

Initially the disease involves *Bahya Roga Marga* but later on due to severity of it *Madhyama Roga Marga* like *Asthi- Sandhi* also becomes involved.

**Probable etio-pathogenesis of the disease:**

The factors which have considered under *Svabhavaja Nidana* as *Streekara Bhava- Asamhanana* together with *Sahaja Nidana* i.e. *Beeja Duṣṭi* and *Pitrija Bhava Dushti* cause vitiation of *Asthi Sthana*. More intake of *Vataja Ahara-Vihar* and less consumption of *Snigdha Prakriti Ahara* cause aggravation of *Vata* especially in old aged people.

In *Jaravastha*, vitiated *Agni Bala* affects *Poshana* of all *Dhatus* excessively. So the proper formation of *Rasadi Dhatu* cannot be performed. Due to this *Kshaya* of all *Dhatus* occur as there is no further new formation. The main reason behind this decay is *Vata Prakopa*. *Vata Dosha* with its all *Guna* spreads in entire body. This stage is the *Prasara Avastha*. Since *Vaigunya of Asthi Dhatu*, aggravated *Vata* deposits here and also *Asthi* is a place for *Vata*. This stage is a *Sthanasanshraya Avastha*. In this stage *Vata* produces symptoms of *Rachanatmaka* and *Kriyatmaka* in *Asthi*. *Khara, Ruksha, Chala* etc. *Guna of Vayu* cause *Shoshana* of *Asthi Dhatu* which turns into *Kshaya* of it. Eventually it leads to hindering the functions of *Asthi Dhatu* and appears as *Sandhi Saithilya* etc.

**Sadhyasadhyata:**

*Asthi* is *Gambheera Dhatu* situated *Vyadhi*. The diseases of *Gambheera Dhatu* are mentioned as *Yapya* or *Kashta Sadhya*[23]. In *Jaravastha* the disease occurs so it can be considered as *Yapya*.

**Postmenopausal Osteoporosis -**

The term Menopause is made up of two words “Meno” and “Pause”. *Meno* means Menstruation (month) and *Pause* denotes to cessation. Therefore, Menopause refers to permanent cessation of Menstruation. The time of Menopause is determined genetically and occurs at a median age of 51 yrs[24,25]. This age is lower in non-white and non-European including Indian women. In India age varies between 45-50 yrs. According to W.H.O. osteoporosis is defined based on the following bone density levels:

- BMD is compared to two norms – healthy young adults (T-score) and age matched (Z-score). A T-score within 1 SD (+1 or -1) of the young adult mean indicates normal bone density.
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- A T-score of 1 to 2.5 SD below the young adult mean (-1 to -2.5) indicates low bone mass.
- A T-score of 2.5 SD or more below the young adult mean (> -2.5 SD) indicates the presence of osteoporosis[26].

**Signs and Symptoms:**
Osteoporosis is a silent disease, until a fracture is sustained.

- Episode of acute pain in middle to low thoracic region or high lumber regions.
- Pain in above mentioned regions while at rest or during routine daily activity is the earliest symptom of osteoporosis.
- The onset of pain is sudden and patient indicates exact moment of its beginning and specific site i.e. vertebral level where the pain originated.
- Spinal movement is severely restricted. Pain intensifies with movements – sitting or standing and is relieved considerably with bed rest in fully recumbent position.
- Vertebral compression fractures may be asymptomatic except some discomfort in the costal margins.
- Incremental loss in height and mild thoracic kyphosis may be evident.

**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 results in decrease in size of thoracic and abdominal cavities, which are responsible for clinically disturbing side effects – exercise tolerance is reduced.
- Abdominal distension, 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[27,28,29].

**Role of Estrogen in Osteoporosis:**
An influence of estrogens on bone mass prior to the menopause was suggested by number of observations in reproductive state. Some studies have shown positive association between bone mass and parity in premenopausal women. Also oral contraceptive use has been associated with higher bone mass in some women, but not in all studies. A number of hypo-estrogenic states in premenopausal women are associated with reduced bone mass. Amenorrhoea in female athletes and ballet dancers is associated with low bone mass and fracture
risk[^30].

**Chikitsa of Rajonivritijanya Asthi-Kshaya:**

For Asthi Dhatu, Asthi Tarunasthi is mentioned as Dravya Samanya[^31]. While describing management of Asthi Kshaya, Acharya Vagbhatta quoted that Basti containing Ksheera, Ghrita and Tikta Rasa should be given[^32]. Basti is regarded as Shreshtha Chikitsa for Vata Prakopa, and Tikta Rasa is Asthiwiddhikara. But Tikta Rasa is Vata provocative too. Drayyas, which are Snigdha, Shoshana and Khara in Guna causes Vriddhi of Asthi as Asthi is Khara in nature. This combination is not present in any single Dravya.

Hence Tiktra Rasa which has Shoshana Gunा, with Basti of Ksheera or Ghrita, which is Snigdha, is recommended in Asthi Kshaya. Ksheera or Ghrita along with Basti will act as Vata Shamaka and Tikta Rasa because of its Panchabhautika composition and Khara, Shoshana Guna will increase Asthi Dhātu.

The same line of treatment is given for management of Asthipradoshaja Vyadhi in Ch. Su. 28/24. Panchakarma, especially Basti and use of Ksheera and Ghrita Siddha with Tikta Rasa should be given. Hemadri while quoting same Shloka in Ayurveda Rasayana on Ashtanga Hridaya mentioned the view of Kharanada that Basti and oral Tikta Rasa with Ksheera and Ghrita could be given in Asthi Kshaya.

This disease falls under Jaravastha. Jara is classified under Svabhavaja Vyadhi which becomes Yapya by Rasayana treatment. Hence for preventing Asthi Kshaya, Dravya that is Tikta in Rasa, Snigdha in Guna and possessing Rasayana Prabhava should be selected.

**Discussion:**

Rajonivritti is a stage of Vata Vriddhi. It is a joint period of Madhyavastha and Vriddhavastha. So the symptoms related with Vridhi of Pitta and Vata are found combined during this period. Treatment given in allopathic science for the disease, is mainly hormonal substitutes and phytoestrogen (i.e. HRT and SERM). But both these therapies have many hazardous effect on body in the form of breast cancer, heart diseases etc. These treatment ultimately down the quality of life. So Ayurveda can be a great substitute to cure the disease.

**Conclusion:**

In Ayurveda, Tikta Ksheea and Ghrita Basti along with Rasayana are the best treatment to overcome the disease. Tikta rasa has the quality of Khara and Shoshana which is similar to the Guna of Asthi. Ksheera is found a rich source of calcium in studies. Some more Dravya like Pravala, Kapardika Bhasma, Mukta Bhasma etc. are best calcium supplement. Ashwagandha, Shatavari are natural phytoestrogen without any side effect. Hence, Ayurveda can play a major role to treat osteoporosis.

**References**

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Saransh:

वर्तमान युग में जहां जनसंख्या तेजी से बढ़ती जा रही है, मूलमूट आवश्यकताओं के प्रति संघर्ष भी कड़ा होता जा रहा है। लोग अधिक भौतिकतावादी और महत्वकामी होने के कारण अपने स्वास्थ्य को भी अनदेखा कर रहे हैं। उनके अनियमित दिन-दिन और आहार-विकार के कारण लालच स्तांभ डिसोर्डर्स अवश्य सामान्य हो चुके हैं। औस्ट्रियोपोरोसिस भी उनमें से एक है। यह एक मेटाबॉलिक डिसोर्डर है जिसमें हड्डियों अवर्तन पतली, कमजोर और भंगुर हो जाती है। महिलाओं में रजोनिश्चितियों के पश्चात होमोस्टसिस की कमी के कारण औस्ट्रियोपोरोसिस का समापन बढ़ जाती है। आयुर्वेद में इस व्यविध का नामकरण नहीं किया गया है परंतु इसके लक्षणों को देखने के बाद इसे अर्थिक्ष्य के समक्ष माना जा सकता है। अर्थिक्ष्य को वात सम्बन्धी रोग माना जाता है क्योंकि वात दौष का इसमें मुख्यतः प्राकृतिक होता है। चर्रक सम्हिता में एक मौलिक सिद्धांत का वर्णन है "समानगुणाध्यासो हि धान्यनाम वृद्धिकारणम" इसके अनुसार जो पदार्थ शारीरिक धातुओं के समान गुण रखते हैं उनके सेवन से वे उन गुणों के शरीर में वृद्धि में सहायक होते हैं आर वे निरंतर सेवन किये जाए। इस प्रकार जो भी औषध, आहार तथा विनोद अथवा धातु के समान गुणधर्म रखते हैं वे अर्थ धातु को बढ़ाने में अत्यंत प्रमुख हो सकते हैं।