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Critical Analysis of *Shukra Dhatu* in Male and Female W.S.R to Post-Menopausal Osteoporosis in Females

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Abstract: ***Kshaya means "Swapramana Hani" i.e decrease in the quantity of the respective substance.[1] Chakrapani dutta explains it as "Nyunatva" which means very less in amount. Acharya Vijayrakshita in Madhukosha Teeka has given detailed description about Pratiloma Dhatu Kshaya and also mentioned Swabhaava as one of the reasons for the Shukra Kshaya. When Shukra Kshaya occurs in a person, then Pratiloma Gati (movement) of Vayu occurs, due to which the first affected Dhatu is the Majja Dhatu. Shukra term denotes for both male and female Shukra, and not only male Shukra. Artava of female should also be considered here. Two forms of Shukra can be seen in the body. One is Dhatu Roopa, and other is the Beeja Roopa which are present in both male and female. The Beeja form of Shukra also has two components i.e Sthira Bhaga (Static) and Chala Bhaga (Dynamic) part. When Kshaya of Shukra is observed, both the forms i.e Dhatu and Beeja forms should be taken into consideration. This Kshaya of Shukra Dhatu again leads to Shosha of the Sneha Bhaga of body and leads to Pratiloma Gati of Vayu. This leads to the retrograde Kshaya of Dhatu. Due to this, Majja Dhatu gets affected first. This Majja Dhatu Kshaya has drastic effects on the Asthi Dhatu and leads to retrograde Kshaya, symptoms like Asthi Saushirya, Asthi Laghuta, Asthi Daurbalya etc. are markedly seen. These symptoms show striking similarity with the features of Osteoporosis.***
Keywords: Majja Kshaya, Post-Menopausal Osteoporosis, Pratiloma Kshaya, Dhatu Kshaya

I. INTRODUCTION

Kshaya means "*Swapramana Hani*" i.e decrease in the quantity of the respective substance.[1] Chakrapani dutta explains it as "*Nyunatva"* which means very less in amount.

Dhatukshaya can also be considered as a counter effect of hinderance in the continuous process of *Dhatu Nirmana Prakriya*. It can be due to disturbance in the *Jathragni* (digestive *fire) or in the Dhatwagni (moieties of Jathragni present in the Dhatus) of the respective Dhatu* or it can manifest as the counter effect of *Kshaya* of another *Dhatu* of its successive or retrograde order. *Acharya Sushruta* also mentioned all types of *Dhatu Kshaya* under the heading "*Shosha"* in *Uttartantra.*[2]

Acharya Sushruta mentioned this *Samprapti* in *Uttartantra* under *Shosha Adhyaya*, where due to factors like *Ativyavaya* etc., *Shukra Kshaya* takes place.[3] This *Shukra Kshaya* further proceeds in a retrograde fashion leading to Kshaya of *Majja dhatu. Majja dhatu* being affected firstly, so in this type of *Kshaya*, osteoporotic changes are seen markedly.

Acharya Madhav mentioned *Pratiloma Kshaya* separately under the heading *Rajyakshma Nidaana. Acharya Vijayrakshita* in *Madhukosha Teeka* has given detailed description about *Pratiloma Dhatu Kshaya* and also mentioned *Swabhaava* as one of the reasons for the *Shukra Kshaya.* When *Shukra Kshaya* occurs in a person, then *Pratiloma Gati* (movement) of *Vayu* occurs, due to which the first affected *Dhatu* is the *Majja Dhatu.*

Shukra term denotes for both male and female *Shukra*, and not only male *Shukra. Artava* of female should also be considered here.

Ashtang Sangrahakara states *Shukra* as *Sara* (final essence) of *Majja Dhatu.*[4] By the proper digestion and assimilation of the ingested *Ahara, Majja dhatu* is formed. From this *Shuddha Roopa* of *Majja, Shukra Dhatu* is formed as a final essence of *Majja Dhatu.*[5]*Majja* (marrow), *Mushka* (testes or ovaries) and *Stana* (breasts) as the special seat of *Shukra Dhatu.*[6]

In *Sushruta Samhita Sutrasthana*[7], Acharya Dalhana quotes that if *Artava* word should be taken into consideration for *Shukra* in females, if not, then females will have only six *Dhatu* which is not possible so *Artava* word is taken as contemporary for *Shukra Dhatu* in females. Furthermore, Acharya Dalhana states that the word "*Cha*" in the verse signifies the presence of *Stri Shukra*.

This points towards two forms of *Shukra*. One is *Dhatu Roopa,* and other is the *Beeja Roopa* which are present in both male and female. The *Beeja* form of *Shukra* also has two components in male i.e *Sthira Bhaga (Static)* and *Chala Bhaga (Dynamic)* part. The

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Chala Bhaga (dynamic) can be considered as *Retas* or sperm, which is capable of *Garbhotpadana* (formation of progeny). this form is ejected from the male body which is ejaculated in female's vagina during coitus.

The *Dhatu* form of *Shukra* in male is the one which is present in whole body, even in the smallest *Roma Koopa*. All type of mitotic and meiotic changes, wear and tear processes of the body and processes of regeneration going inside the body can be considered as *Shukra Dhatu. Acharya Arundatta*, mentioned about the *Chala Shukra Dhatu* which circulates in whole body.[8]

The *Dhatu Roopa* of *Shukra* is present in both male and female, functions of which are providing lusture, strength, pleasure to the body.

Similarly, *the Sthira (static)* form of *Shukra* in female is the *Beeja Bhaga of Artava.* The *Beeja* form of *Shukra* and *Artava* in male and female is again explained by *Acharya Arundatta* in commentary of *Ashtang Hridaya* which states that only *Beeja Roopa* of *Shukra* and *Artava* are responsible for *Garbha Janana* (production of progeny). [9] The *Chala* form (dynamic) of *Shukra* in the female body is formed directly from the *Sneha Ansha* of *Rasa Dhatu* (*By Khale Kapota Nyaya*) known as *Rajah.* This *Rajah* is formed as a *Updhatu* of *Rasa Dhatu*.[10],[11] ,[12] and is transferred to *ArtavaVaha Srotas* through the *Artavavahi dhamani*. It gets stored and collected (*Upchaya*) in *Garbhashaya* for a particular time and released out every month from female's body for three days. This is responsible for smooth functioning of various physiological process in females. Menstrual flow regulated by ovarian hormones (estrogen and progesterone) can to be taken into consideration in this context. The Chala form of *Shukra* can also be seen as secretions from various bulbourethral glands secreted by female during coitus. *Acharya Sushruta* in *Sharir Sthana* states that it is like a *Ghrita Pinda* which liquifies and comes out of female body during coitus. [13] This is also explained by *Acharya Indu* in commentary of *Astanga Samgraha* in elucidates that female secrets *Shukra* in coming with contact of male. This is further supported by *Acharya Arundatta* in the commentary of *Ashtang Hridaya* that a female in her reproductive age secrets *Shukra* during intercourse which can also be secreted by *Smriti* (thinking) , *Sparsha* (touch) , and *Darshana* (seeing) of the male partner.[14] He further adds that this *Shukra* is incapable of *Garbhotpadana* (producing progeny).[15] The concept of *Anasthi Garbha* by *Acharya Sushruta* further solidifies the concept.[16]

So, from the above discussion, we can conclude that "*Shukra*" word is used as a contemporary for both male and female. In female, *Artava* is used to denote the "*Shukra*". [17]

When *Kshaya* of *Shukra* is observed, both the forms i.e *Dhatu* and *Beeja* forms should be taken into consideration.

Artava in young women, due to growing tissues and maturing body, gets accumulated in *Garbhashya* and gets excreted every month, if fertilization does not occur. But in old age, due to degenerating and matured *Dhatu*, this *Artava* undergoes *Kshaya* (diminution). [18]

This *Kshaya* of *Shukra Dhatu* again leads to *Shosha* of the *Sneha Bhaga* of body and leads to *Pratiloma Gati* of *Vayu*. This leads to the retrograde *Kshaya* of *Dhatu*. Due to this, *Majja Dhatu* gets affected first. This *Majja Dhatu Kshaya* has drastic effects on the *Asthi Dhatu* and leads to them retrogrades *Kshaya*, symptoms like *Asthi Saushirya, Asthi Laghuta, Asthi Daurbalya* etc. are markedly seen.

A. Effect of Loss of Ovarian Hormones on Bone And Bone Marrow

Estrogen receptors are expressed by cells in the bone marrow. Estrogen plays a crucial role in secretion of osteoprotagerin (a decoy receptor) that binds with the RANK ligand inhibiting the binding of RANKL with RANK receptor, thus inhibiting the stimulation and production of osteoblast formation. In postmenopausal women, estrogen deficiency leads to increased production of IL -1, IL -6, PNF, RANKL by stromal cells of bone Marrow.

Estrogen deficiency is responsible for the production of TNFα by T-cells of the bone marrow, which in turn stimulate the expression of sclerostin in blood which is responsible for bone loss.

All of them have a combine effect on more expression of osteoclast progenitor in marrow leading to increased Osteoclastogenesis.

Estrogen suppresses bone resorption in a both direct and indirect way. The most intense impact of estrogen is obstructing the new osteoclast formation. Estrogen directs RANK (Receptor activator of atomic factor κB) signalling in osteoclastic cells and instigates apoptosis of osteoclasts. Osteoclasts cells are hematopoietic in origin, situated on endosteal surface within the haversian framework and on the periosteal surface.

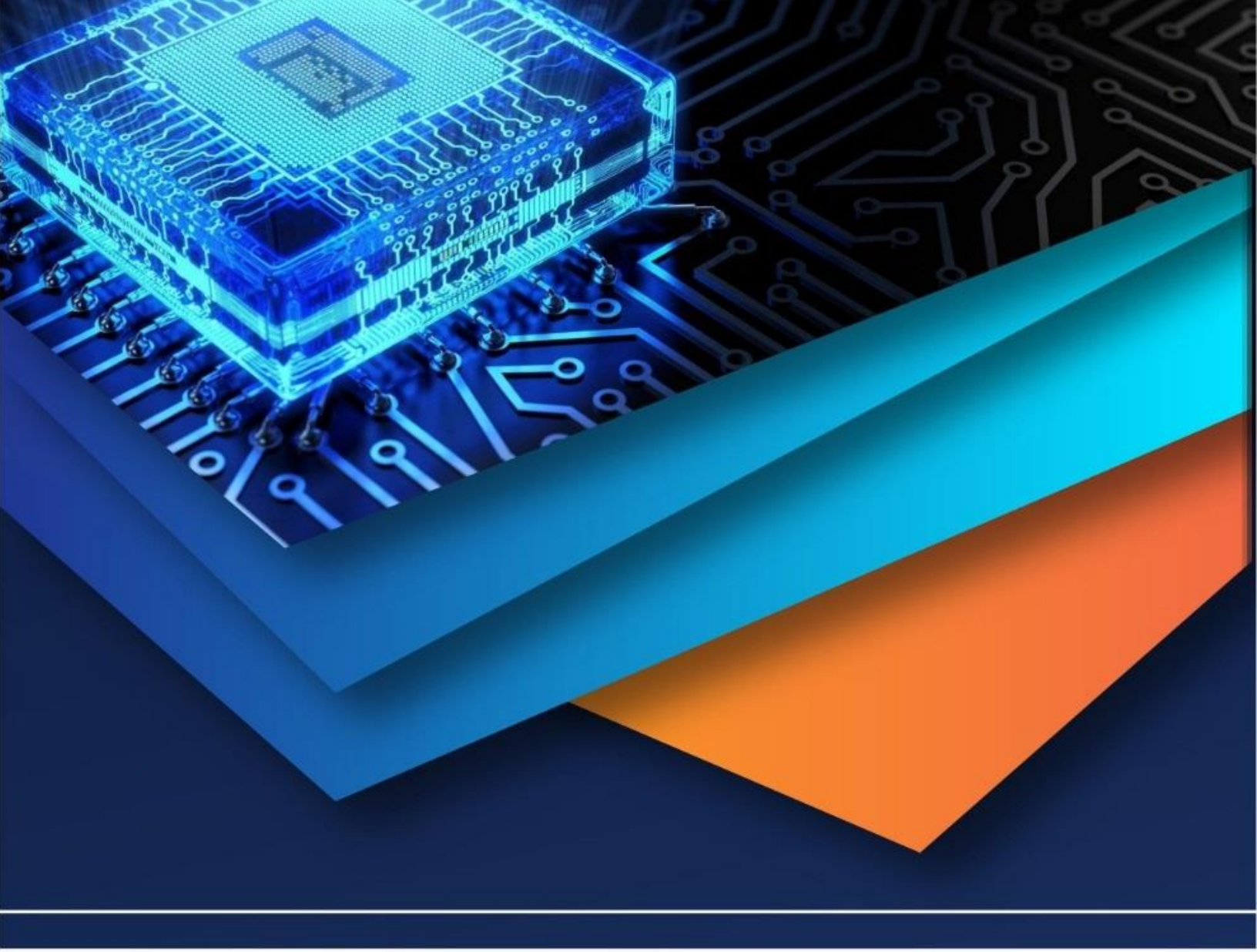
II. CONCLUSION

Therefore, *Shukra* term denotes for both male and female *Shukra*, and not only male *Shukra. Artava* of female should also be considered here. When *Kshaya* of *Shukra* is observed, both the forms i.e *Dhatu* and *Beeja* forms should be taken into consideration. This *Kshaya* of *Shukra Dhatu* again leads to *Shosha* of the *Sneha Bhaga* of body and leads to *Pratiloma Gati* of *Vayu* resulting into retrograde *Kshaya(*deterioration) of *Majja* (Marrow) and ultimately results are seen on *Asthi*(bone) in form of osteoporosis.

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