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# A REVIEW ON EFFECTS OF AGEING ON *DHATUS*

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**Abstract:**

Body is defined as "that which decays" what decays is the group of *dhatus*, the constituent tissues that support the life. Ageing is defined as a progressive impairment of function resulting in loss of adaptive responses to stress and a growing risk of aggravated diseases .As per the *Ayurvedic* principles there is a predominance of *vata* in old age which is said to be one of the important cause of ageing. The vitiated *vata* affects adversely the strength, complexion and happiness, the span of life, sense faculties and functions of motor organs and gives rise to fear, anxiety, bewilderment, and take away the life.[1] No special symptoms are mentioned in *Ayurvedic* text about the ageing effects on particular *dhatus*. Whatever signs and symptoms of ageing are explained, out of them some or other symptoms pertain to one or other *dhatu.* This article mainly focused on effects of ageing on different *dhatus* with respect to different systems of the body.

**Key words:** Ayurveda, Dhatus, Ageing, Vatadosha.

## Introduction:

*Charaka* and *Susrutha* as mentioned the effect of ageing on dhatus as" *Hiyamana*" or "*Kshiyamana*" which means there is decrease in the quantity and quality of the *dhatus*. After birth, growth and senility ultimately leading to death are inevitable process. It is correctly stated that ageing begins before birth and continues throughout life at different rates, in different races for different individuals and different tissues of the body.[2] *Vayu* and *dhatu* are inversely proportional to each other thus, when *dhatu* increases *vayu* decreases. This change in quality of tissue is also change in ageing cells in the form of atrophy, hypertrophy, hyperplasia, dysplasia, hyperplasia and neoplasia, These abnormal changes in the cells mainly seen in ageing disorders, among these atrophy and hypertrophy of the cells is very commonly seen in ageing tissues. *Vaghbhat* and *sharangadhara* has focused on the decade wise ageing effects on the body. As per *Ayurvedic* scholars ageing effects are not seen in all the tissues at single given time. Some tissues show faster ageing effects and some show very late effect of age on a particular tissue. As per *Vaghbhat* and *sharangadhara* childhood is lost in the first decade of life. Many factors are elaborated by *Ayurveda* which hastens ageing effects on the body by *Ayurveda.* This ancient science has considered very small but important factors related to ageing. This is the only system of medicine which elaborates the effect of diet, lifestyle, mental and physical condition of ageing process of the body. The factor which hastens the ageing process is also well elaborated. The physiological constitution as per the age is also mentioned in *Ayurveda*. It has been clearly stated that in the early years of age there is a predominance of *kapha dosha*, in middle years of life prevalence of *pitta dosha*, is seen and in later years predominance of *vata dosha* is seen. This clearly suggests that more the

supremacy of vata dosha early aging effects or vitiation of *vata* dosha may aggravate ageing effects on the body.

*Ayurveda* explains Ageing process starting from birth to death as *vaya.* The chronological age is mainly divided into three stages i.e., *Baalya, Madhyama and Vriddha. Acharyas* have also explained the biological changes occurring during these phases. Here we mainly focused on the Effects of ageing in different systems of the body.

**Aims & objectives of the study.**

1. To re-evaluate, discuss, and elaborate the various *Ayurvedic* concepts and principles related to aging.
2. To understand the effects of ageing in related to modern concepts.

**Materials and methods:**

This article is based on a review of *Ayurvedic* texts. Materials related to ageing, *vaya* and other relevant topics have been collected. The main *Ayurvedic* texts used in this study are *charaka samhitha, Astanga sangraha,Astanga Hridaya, Bhava prakasa,and sharanga dhara samhitha,* and available commentaries on these. We have also referred to the modern textsand search various websites to collect information on the relevent topics.

**Effects of ageing in muscles:**

As per *Ayurveda* fats are developed after muscle . The metabolism of particular *dhatu* depends on previous *dhatu* .As per this theory of *Ayurveda* metabolism of fats depend on metabolism of muscles, as fats are developed from the *sara* or *prasada* part of muscles.This theory can be correlated with the following learning .Increased number of adipocytes and fats accumulation in non adipose tissues leads to adiposity. These changes can impose functional limitations and increase morbidity. Lipofuscin and fats are deposited in muscle tissue, then muscle shrinks, muscle tissue is replaced slowly and the lost muscle tissue is replaced by fibrous tissue. This is most noticeable in hands which may appear thin and bony. In men decreased testosterone levels occurring during ageing can be a contributing factor to this. [3]

**Body Fat and Aging**:

Body fat increases until the middle age and then weight typically begins to decrease. The body fat also moves deeper in the the body as we age. By age 75 the percentage of adiposcytes typically doubles compared with what is during the young adulthood. In one of the studies visceral adipose tissue (VAT) values are significantly higher in the older groups. Values for triacylglycerols, cholesterol, fasting glucose, 2 h glucose and the sum of the glucose values during oral glucose tolerance test are significantly higher in older subjects. In the older age group it is seen the regional body fat distribution is different from that in the younger subjects. Older persons have larger amount of visceral fat. Values for metabolic variables are higher in older subjects.[4]

**Bone Aging:**

Starting at the age 35 our bones begin to loose density.(Walking running and resistance training can slow this process.) As a result, bones thin and increasingly suspectable to fractures. As this process accelerates after 50 age osteoporosis becomes more common. It weakens bones to the point that fracture occur easily. In

the advanced stage of osteoporosis even tugging on a cabinet door, a fall on floor can cause a fracture. Aging causes cartilage to loose water, making it more vulnerable to injury from repetitive motion and stress .Arthritis is characterized by pain and stiffness in the joints and in some forms, swelling redness and heat. It is more common with each passing decade. Osteoarthitis the most common form of arthritis occurs when cartilage begins to fray and decay.[5]

***Majja dhatu* and Aging** :

*Majja* dhatu includes both nerve tissue and (nerves ,neurons brain ,spinal cord, peripheral nervous system and bone marrow).Increase in the prevalence of *vata vyadhis* is one of the factors for ageing. Looking towards *Ayurvedic* prospective of *vata vyadhi* pathology "*Dehe strotansi rektani puraetva anilobali"* it is mentioned that more prevalence of *vata dosha* is seen in nervous system (*majja vaha srotas*) and properties and activities of nerves and related organs decline. .Structural imaging of brain indicates that although the brain shrinks or show voluntary changes with age these changes are not equal across brain structures. .There is more shrinkage in mediotemporal areas , and little decrease in the volume in the occipital cortex. There are decreases in both gray and white matter and evidence for demyelination. Increase in the white matter hyperintensities occur with age .The functional integrity of several neuro transmitter systems is altered by the aging process. There is considerable evidence for a presynaptic cholinergic deficit during aging in many brain regions based on the reductions in the enzyme responsible for synthesis of acetylcholine, choline and choline acetyl transferase .in cortex and striatum and in acetylcholine synthesis in temporal cortex .Further more , there is decrease with age in both muscarinic and nicotinic cholinergic receptors.There is wide variations in the response of monoaminergic systems to aging.PET studies confirm substantial aging reductions in specific binding to dopamine D1 and D2 receptors.Glutamic acid decarboxylase responsible for the synthesis of vinyl-aminobutric acid (GABA)declines with age in cortex , hippocampus and striatum while there is limited evidence for decrease in markers of glutametargic system( transporter and NMDA receptor).[6]

***Shukra* dhatu and aging :**

As *shukra* is last *dhatu* it is "*Saar*" or essence of all *dhatus*, it is very important to preserve *shukra* ,where it loss cause decrease in the "*ojas*" life energy of the body.*Shukra dhatu* (generative tissue )is one of the seven *dhatus* in the body and orginates from *Shukra dhara Kala* , *Shukra dhara* in the sex organs give birth to sperm and ova. This *dhatu* influences ones strength courage love and happiness .The average sperm count for healthy person is 250 million sperms a day. Increasing age is associated with decreased semen volume, decreased sperm motility and decreased number of morphologically normal sperm. Several recent studies have found that there is little influence of age on male fertility.[7]

**Ageing changes in body shape**:

The human body is made of fat lean tissue (muscles and organs) bones , water and other substances . As we age the amount and distribution of these materials will change .People typically loose about 1 cm (0.4 inches) every 10 years after the age of 40. Height loss is even greater after 70 years old. In the total one may loose 1 to 3 inches in height as one age. Men often gain weight until about the age 55, then begin to loose weight. This may be related to a drop in the male sex hormone testosterone. Women usually gain weight until the age of 65, then begin to loose weight .Weight loss is in part caused by a loss of muscles tissue. The joints become stiffer and less flexible, fluid in the joints decrease and the cartilage may rub together and

erode. Minerals may get deposited in some of the joints (calcification) .This is most common in the shoulder.[8]

**Ageing changes in the Gastro intestinal tract** :

There is considerable evidence that the incidence of certain problems such as dysphagia and constipation, increases dramatically with age. The areas with greatest risk of developing age related changes are the upper GI tract particularly the oropharynx and oesophagus and the distal tract (colon and rectum) .The amplitude and duration of peristaltic pressure wave in hypopharyngeal sphincter of elderly humans are increased , but the amplitude of upper oesophageal sphincter is decreased .A decrease in the maximum force and lower maximal velocity of shortening is observed in longitudinal smooth muscle in the urinary bladder of aging rats. In colonic smooth muscle cells from aging rats, a decrease in the calcium and potassium channel currents affects the initiation of contraction .Significant effects of ageing on gastric and colonic motility in rats include slow gastric emptying of liquids and decreased fecal pellet transit and production .The age dependant changes are both in cholinergic neurotransmission as well as the response of smooth muscle to acetylcholine. Saliva production decreases and incidences of peritoneal diseases increases with ageing .Gall bladder emptying becomes slow, low liver enzymes are secreted and less detoxification of food takes place.[9]

**Ageing changes in the nervous system :**

As people age their brain and nervous system go through natural changes. The brain and spinal cord loose nerve cells and weight .Nerve cells may begin to transmit more slowly than in the past. Waste products can collect in the brain tissue as nerve cells break down, causing abnormal structures called plaques and tangles to form. A fatty brown pigment (lipofuscin) can also build up in the nerve tissue. With ageing decreased flow and reduced oxygenation to the brain causes slower transmission of nerve impulses. This change can cause the elderly to need additional time for motor and sensory tasks involving speed, balance coordination and fine motor activities.[10]

**Ageing changes in the Cardio vascular system:**

Age is the major factor for cardio vascular disease. Heart diseases and stroke incidence raises steeply after the age of 65. Accounting for more than 40 percent of all deaths among people age from 65 to 74 and almost 60 percent at the age of 85 and above. People age 65 and much more are likely than younger people to suffer heart attack, to have stroke or to develop coronary heart disease and high blood pressure leading to heart failure. Atherosclerosis in turn is the underlying cause of most cardio vascular diseases . Angina that is the chest pain caused by the temporarily reduced blood flow to the heart muscle causing pain the chest , in the left arm or between the shoulder and abnormal heart beats are found in ageing heart .[11]

Shifts in the circulation of blood to various organs can also change the blood flow to kidneys may decrease 50 percent and to brain by 15 to 20 percent. Finally heart murmurs are more common with age because our heart valves become flexible and calcium deposits build up.

**Respiratory changes** :

In aged persons lungs become less elastic and chest wall stiffens. In addition the expansion on trachea contributes to a decreased surface area in the lungs .Person cant cough forcefully ,which also diminishes ability to clear the germs from lungs, as a result causing upper respiratory infections. In smokers respiratory potential is reduced in later years. Older adults also experiences some difficulties with swallowing, which

increases the chance of aspiration particles of food or other substances into the lungs. Aspiration is the common cause of the pneumonia in older adults. Lung capacity and function drop off with time. Physically active older people who regularly participate in aerobic excercises, include walking and cycling are way ahead of curve. A generous intake of vitamin C also helps maintain pulmonary function as persons age. Loss of pulmonary function is the major predictor of disease and death in older adults.[13]

**Ageing effects on urinary system** :

Normal human ageing occurs with morphological and functional changes in the kidneys. Studies have revealed, however the age related renal changes are accelerated by co – morbid conditions such as hypertension atherosclerosis, diabetes and heart failure. Blood flow to the kidneys decreased as much as 10 percent per decade can be decreased nearly half that of younger people. As humans age the kidneys loose one quarter to one third their mass as both the nephrons and size of the nephrons filtering units decreases. By age 80 the total number of glomeruli fall by 30 to 40 percent and another 30 percent may become sclerotic and non functional .These changes reduce the rate at which the blood flow is filtered by the kidneys. In a reasonable number of healthy elderly subjects the GFR remains within the lower limit range. In contrast effective renal plasma flow decreases proportionally more than GFR. It is still unresolved whether these age related changes in renal haemodynamics are caused by structural abnormalities or whether there also exists a functional abnormality. Bladder capacity decreases and there is increase in residual urine and frequency .These changes increase the chances of urinary infections, incontinence and urinary obstructions**.**[14]

**Discussion:**

Nobody wants to grow old — a dilemma that everyone faces. In *Ayurveda*, every condition (whether transient or persistent) that leads to a disturbance of homeostasis is termed as a disease.
Thus, *Vriddhavastha* has also been considered as a disease: It is categorized under the head of natural diseases. These natural diseases are due to *Swabhava* (nature) and depend on *kala* (time). If a person can cross the limitations of time successfully with the practice of yoga and *samadhi*, he can escape aging and death.[15]

**Conclusion:**

The body is decaying continuously, as shown by its etymology, that is, *shiryate anena iti shariram.* Untimely ageing is wholly preventable if the principles of *Ayurveda* are strictly followed. It is inevitable and it can only be delayed. During this process the *Hrasa* or decline in specific features can be observed in specific decades. *Ahara* and *vihara* certainly have an impact on the sudden or delayed manifestation of the *jara*. So one should avoid *ahita ahara* like *gramya ahara* and should consume *hita ahara*. *Vihara* like *Achara rasayana* should be adopted to delay ageing. Intake of *ghritha* and *ksheera* daily in proper quantity should be practiced from the childhood and can be continued lifelong for maintaining the youth.

**Conflict of Interest:**

We Dr. Devaki Raghavendra Sunil Kumar, Dr.Rajimunnisa Begam Shaik, and Dr.CH.Hema Sundari declared that there is no conflict of Interent regarding publication of this manuscript.

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