

CRITICAL STUDY OF *BHRAJAKA PITTA* IN THE MODERN PERSPECTIVE

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ABSTRACT

According to and *Acharya Sushruta Dosha, Dhatu Mala* are said to be *Moola* (origin) of *Sharira*. All of these entities are equally important but *Doshas* are basic pillar of our body. Our body entire functioning is dependent upon the *Doshas*. *Pitta* is very essential entity because it is said to be responsible for digestion, metabolism, production of heat and other forms of energy. *Pitta Dosha* has five subtypes i.e. *Pachaka Pitta, Ranjaka Pitta, Bhrajaka Pitta, Alochaka Pitta* and *Sadhaka Pitta*. The major functions attribute to the five types are *Pakti, Raga, Medha Ojas Tejas* and *Ushma* respectively. *Bhrajaka Pitta* as its name suggests that it is responsible for *Bhrajana* i.e. providing lusture and natural color of skin. It has also been stated that is governs the normal and abnormal temperature of the body. In this article we are mainly focusing on *Bhrajaka Pitta* with its modern perspective.

KEYWORDS: *Dosha, Pitta, Bhrajaka Pitta, Agni, skin, Melanin.*

INTRODUCTION

Ayurveda is an ancient science of life practiced with an aim of preservation and promotion of disease. The normal status of *Doshas, Dhatus, Malas, Agni* along with the cheerfulness of *Mann* (Mind), *Atma* and the *Indriyas* (Five *Gyanendriyas* and five *Karmendriya*) is called as health.^[1] *Dosas, Dhatus* and *Malas* are the foundations of the body.^[2] *Dosas* are three viz, *Vata, Pitta* and *Kapha*. *Pitta* is one of the three *Doshas* that form the *Tridoshas* of the *Ayurvedic* philosophy, *Pitta* along with *Kapha* and *Vata* are made up of the five elements that form material existence in the universe. Each *Dosha* contains two of these five elements with each element governing the person's personality physical characteristics, health and the mind. The term *Pitta* is derived from the *Sanskrit* root 'Tap' and the word 'Tap-santape' means

creation of heat or oxidation process or color change etc.^[3] The transformation, digestion and metabolism is done by *Pitta Dosha*. *Agni* is the most commonly used synonym for *Pitta* while describing sub-types of *Pitta*. *Sushruta* has used the word *Agni* e.g. *Bhrajaka Agni* in spite of *Bhrajaka Pitta*.^[4] As *Pitta* and *Agni* are many times used as synonyms of each other. *Pitta* is a substance with the specific properties and functions. *Agni* is the energy residing in *Pitta*. This *Agni* in normal or abnormal conditions show positive or negative effects as explained e.g. proper or improper digestion, proper or improper vision, thermal regulation, normal or abnormal color, courage or fear, anger or joy, satisfaction or metabolic functions.^[5]

Sthanas of Pitta – *Pitta* is located in the whole body but the general *Sthanas* of *Pitta* are *Sweda, Rasa, Lasika, Rakta, Amasaya, Nabhi*.^[6]

Function of Pitta^[7]– *Pitta* is responsible for digestion and indigestion; vision and loss of vision; the normality and abnormality of temperature; the healthy and diseased look; intrepidity and fear, anger and delight, confusion and lucidity and such other pairs of opposite qualities.

Types of Pitta^[8] - *Pachaka, Ranjaka, Sadhaka, Aalochaka, Bhrajaka Pitta*.

Bhrajaka Pitta: The *Pitta* which is responsible for the production of “*Bha*” (complexion) of skin is called as *Bhrajaka*. It is mentioned that the production of normal and abnormal temperature of the body as well as normal and abnormal colour of the skin which is mentioned as among the functions of *Pitta* are attributed to *Bhrajaka Pitta*.^[7]

Location of Bhrajaka Pitta: *Bhrajaka Pitta* is located in the skin.^[8]

Functions of *Bhrajaka Pitta*

1. The production of normal and abnormal heat of the body.^[9]
2. The production of normal and abnormal colour of the skin, as a whole and parts and structures of the body viz., hands, feet, sides, back, abdomen, thighs, face, nails, eyes and hairs.^[10]
3. The absorption and digestion of substances used together with oils (for oil bath), decoctions used for sprinkling over the body etc.^[11]

Skin – Skin is the largest organ of the body. It is made up of two layers i.e. outer epidermis and inner dermis. Epidermis is formed by stratified epithelium, which consists of 5 layers –

1) Stratum corneum 2) Stratum lucidum 3) Stratum granulosum 4) Stratum spinosum 5) Stratum germinativum.^[12]

Skin completely covers the body and is continuous with the membranes lining the body orifices. It;

- Protects the underlying structures from injury and from invasion by microbes
- Contains sensory (Somatic) nerves endings of pain, temperature and touch.
- It involved in the regulation of body temperature.^[13]

Skin coloration according to modern point of view – Melanin, hemoglobin and carotene are three pigments that impart a wide variety of colors to skin.^[14]

Melanin –Melanin is formed by melanoblasts which are present normally, in the basal layer of epidermis and dermis. The color of the skin depends upon the distribution of melanoblasts, the melanin concentration. In addition to the skin melanin is normally found in the retina, the ciliary body, the choroid, the substantia nigra of the brain and the adrenal medulla. In albinos, the melanin forming cells have been shown to be entirely absent from the tissues. The number and distribution of melanin producing cells of the body vary from individual to individual and they are genetically determined. Frequently, there is a congenital absence of these cells in various regions of the body, resulting in splotchy areas of de-pigmentation, known as vitiligo. Occasionally, there it a total absence of melanoblasts in the skin, resulting in the production of albinism. The exact chemical composition of melanin is not known but, it is generally believed to be a polymer of tyrosine, formed by the action of the copper containing enzyme tyrosinase. The melanin producing cells contain an enzyme – the dopa oxidase – which, in the presence of di-hydroxy phenylalanine (DOPA), produces a dark cytoplasmic color reaction. It has been shown that dopa oxidase and tyrosinase are the same enzyme, acting first, to oxidize the tyrosine to dopa and then, dopa into melanin. After the formation of melanin, the pigment granules are stated to migrate to cells of the epithelium where, they are phagocytized.^[15]

Melanocyte Stimulating Hormone (MSH): MSH is secreted by the intermediate lobe of pituitary gland. An increase in MSH will cause the darkening of the skin color. ACTH and MSH share the same precursor molecule, Pro-opiomelanocortin (POMC). Cushing's syndrome due to excess ACTH may also cause hyperpigmentation (Acanthosis nigricans). The level of MSH increases in humans during pregnancy. Different levels of MSH are not the

major cause of racial variation in skin color. There are variations in their hormone receptors causing them not to respond to MSH in blood. Deficiency of melanin leads to Albinism (Hypopigmentary congenital disorder).^[16]

Hemoglobin – The amount and the nature of hemoglobin that circulates in the cutaneous blood vessels play an important role in the coloration of the skin.^[17] As the oxygen content of blood increases its color changes too. Blood rich in oxygen is bright red because of the high levels of oxyhaemoglobin it contains, compared with blood with lower oxygen levels, which is dark bluish in color because it is not saturated.

Carotene – Carotene is a yellow – orange pigment and present in lipid rich areas (i.e. the stratum corneum and the fat of the corium and subcutaneous tissue). Carotene gives egg yolk and carrots their color. Carotene rich foods that the skin actually turns orange, which is especially apparent in light skinned individuals. Decreasing carotene intake eliminates the problem.^[18]

Function of percutaneous Absorption^[19] – The superficial layers of the epidermis, the stratum corneum, provide almost all the skin's barrier properties. The stratum corneum is made up of layers of overlapping cell plates containing the fibrous protein keratin, most drug absorption is trans cellular: It is unlikely that noticeable absorption occurs between cells or through sweat pores their follicles, It is a passive diffusion process, the magnitude of which will depend on the integrity and efficacy of the epidermal barrier but which will be influenced by the drug itself. Drugs with low molecular weight (below 800 Daltons) with a high water and lipid solubility show the greatest penetration. The vehicle that contains the applied drug is important. So too is the degree of hydration of the stratum.

Protection from ultraviolet Rays^[20] – Skin protects the body from ultraviolet rays of sunlight. Exposure to sunlight or to any other source of ultraviolet rays increases the production of melanin pigment in skin. Melanin absorbs ultraviolet rays, at the same time, the thickness of stratum corneum increases this layer of epidermis also absorbs the ultraviolet rays.

Regulation of body temperature^[21] – Skin plays an important role in the regulation of body temperature. Excess heat is lost from the body through skin by radiation, conduction, convection and evaporation. Sweat glands of the skin play an active part in heat loss, by

secreting sweat. The lipid content of sebum prevents loss of heat from the body in cold environment.

Mechanism of temperature regulation^[22]

When body temperature increases – when body temperature increases, blood temperature also increases. When blood with increased temperature passes through hypothalamus, it stimulates the thermo receptors present in the heat loss center in preoptic nucleus. Now, the heat loss center brings the temperature back to normal by two mechanisms:

1. Promotion of heat loss
2. Prevention of heat production

1. Promotion of heat loss – when body temperature increases, heat loss center promotes heat loss from the body by two ways:

1. By increasing the secretion of sweat: when sweat secretion increases, more water is not from skin along with heat.

2. By inhibiting sympathetic centers in posterior hypothalamus: this causes cutaneous vasodilation. Now, the blood flow through skin increases causing excess sweating. It increases the heat loss through sweating. It increases the heat loss through sweat, leading to decrease in body temperature.

2. Prevention of heat production – Heat loss center prevents heat production in the body by inhibiting mechanisms involved in heat production, such as shivering and chemical (metabolic) reactions.

When body temperature decreases – when the body temperature decreases, it is brought back to normal by two mechanisms:

1. Prevention of heat loss
2. Promotion of heat production.

1. Prevention of heat loss – when body temperature decreases, sympathetic centers in posterior hypothalamus cause cutaneous vasoconstriction. This leads to decrease in blood flow to skin and so the heat loss is prevented.

2. Promotion of heat production

Heat production is promoted by two ways:

- I. Shivering: when body temperature is low, the heat gain center stimulates the primary motor center for shivering, situated in posterior hypothalamus near the wall of the III ventricle and shivering occurs. During shivering, enormous heat is produced because of severe muscular activities.
- II. Increased metabolic reactions: Sympathetic centers, which are activated by heat gain center, stimulate secretion of adrenaline and noradrenaline. These hormones, particularly adrenaline increases the heat production by accelerating cellular metabolic activities.

Simultaneously, hypothalamus secretes thyrotropin-releasing hormone. It causes release of thyroid-stimulating hormone from pituitary. It in turn, increase release of thyroxin from thyroid. Thyroxine accelerates the metabolic activities in the body and this increases heat production.

Chemical thermogenesis: it is the process in which heat is produced in the body by metabolic activities induced by hormones.

Thermoregulation^[23] – thermoregulation is the homeostatic regulation of body temperature. The skin contributes to thermoregulation in two ways: by liberating sweat at its surface and by adjusting the flow of blood in the dermis. In response to high environmental temperature or heat produced by exercise, sweat production from eccrine sweat glands increases; the evaporation of sweat from the skin surface helps lower body temperature. In addition, blood vessels in the dermis of the skin dilate (become wider); consequently, more blood flows through the dermis, which increases the amount of heat loss from the body. In response to low environmental temperature, production of sweat from eccrine sweat glands is decreased, which helps conserve heat. Also, the blood vessels in the dermis of the skin constrict (become narrow), which decreases blood flow through the skin and reduces heat loss from the body.

DISCUSSION

Bhrajaka pitta is located in the skin. It imparts the characteristics of color and luster, so it is termed as *Bhrajaka*. *Acharya Charaka* has also stated that the production of normal and abnormal temperature of the body as well as the normal temperature of the skin is due to *Pitta*. The variations in the color of the skin are the functions of the *Bhrajaka Pitta* which is located in the skin. *Arundutta* the commentator of *Ashtanga Hridaya* has described the

Bhrajaka Pitta and its functions like *Deepana* and *Pachana*. The substances applied on the skin by *Abhyanga*, *lepan* and *Parisheka* are being digested by the *Bhrajaka Pitta*. Thus *Abhyanga*, *Parisheka* etc. do their action properly only after being digested by *Bhrajaka Pitta*, as no substance can act properly without digestion. In modern the skin owes its color to: (i) amount of melanin, (ii) the state of circulation in the dermis and (iii) the amount of reduced haemoglobin. Skin plays the important role in regulation of body temperature in response to any change in external or internal environment with the help of sweat.

CONCLUSION

Bhrajaka Pitta is responsible for production of normal and abnormal colour of the skin and body temperature. Derangement of *Bhrajaka Pitta* will cause defective management of *Ushma* and *Varna* (Temperature and colour). In modern it is correlated with melanin. The colour of the skin will mainly depend upon the pigment melanin and MSH hormone secreted from the pituitary gland. Melanine is also having a role in temperature regulation also. So, this article will provide us brief knowledge of pitta and *Bhrajaka Pitta* along with its modern correlation.

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