

Skin from The Point of View of *Chikitsa* and *Kriya Sharir*

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ABSTRACT

Skin is called "Twak" which covers the whole body. so a detail study of Twak is important, as it is the seat for all Twacha Rogas. The conceptual aspect of skin needs to be understood because skin disorder is outer exhibition of some kind of internal pathology.

Skin, the largest organ of human body, holds significant importance in maintaining normal human physiological condition. The ancient science of Ayurveda has noted its features ages back. This article lays emphasis on the known and the lesser known functions of skin, its correlation with Ayurvedic

In depth analysis is provided regarding the thermoregulatory modality of skin. List of various clinically proven indigenous drugs of Ayurveda is also discussed briefly. Significance of skin as a tool to assess the health status of the patient is a boon of Ayurvedic diagnostic methodology; in detail description of which is provided in this article. This article is the simple and sincere attempt to explain the skin with a view of Kriya Sharir and Chikitsa

KEYWORDS: Twacha, Sharir Kriya, Ayurvedic Chikitsa.

INTRODUCTION

Structure of Skin

[3] Skin is the outermost covering of our body which protects our body from outer environment as well as plays an important role in sensory and thermoregulatory function of the body. In fact skin is considered the largest organ of human body. According to Ayurveda it is the Updhatu of Mamsadhatu [1] (i.e. muscle). Skin is believed to be formed by the metabolism of Rakhta dhatu (i.e. blood); a phenomenon similar to the formation of cream over milk, after cooling it post heating. [2] The synonyms of skin are Twak, Chavi, Chdani, Asrugdhara. The Vyutpatti of Twak dictates on the terms Chaadhana which means to cover. Twachai.e., the skin has 6 layers according to Charak Samhita [3] as well as in Kashyapa Samhita and Ashtang Sangraha. Acharya Sushruta and Sharangdhar believed skin to be of seven layers. They include Sthula/Mamsadhara which can be compared to hypodermis (layer beneath the skin). Hence according to Ayurveda, skin has six layers. Anatomically skin is divided into two parts [4] i.e.

1) Epidermis (Outer Skin): [5] [6]

- a. Avabhasini (Stratum corneum)
- b. Lohita (Stratum lucidum)
- c. Shweta (Stratum granulosum)
- d. Tamra (Stratum malpighi)

2) Dermis (Inner Skin)

- a. Vedini (papillary layer)
- b. Rohini (reticular layer)
- c. Mamsadhara (hypodermis)

COLOUR OF SKIN

The skin gets coloured owing to the presence of pigmentation as well as the blood flow which takes place at the level of capillaries[5]

.Pink, Blue and pale are associated colours of skin w.r.t blood flow in sub papillary venous plexus. The following factors have deep influence over the colour of skin:[7]

- 1) Melanin: It is a pigment secreted by the melanosomes present in the basal layer of epidermis. Melanin is responsible for giving the skin its black, white, yellow colour as well as protects from harmful UV radiation.[8]
- 2) Melanoid: It's a bio transformative derivative of melanin responsible for absorption of light.
- 3) Carotene: Yellow coloured pigment found in fat storage of our body found more in females than males. It is a precursor of vitamin A.
- 4) Oxyhaemoglobin: It gives reddish warm appearance to the skin.
- 5) Reduced Haemoglobin: It gives bluish appearance to the skin which feels cold and clammy. Ageing is most prominently noticed on skin. With age skin loses its elasticity giving rise to wrinkles. Depletion of hypodermic fat depots also contributes to wrinkles as well.

LUSTRE OF SKIN[1]

Ayurveda gives prime importance to the lustre of skin in case of deciding the diagnosis and the prognosis of any disorder. Chaaya is found assimilated into the Varna (colour) and Prabha of the skin. Synonyms of Chaaya are Sansthana and Akroti[9] (Which are also the synonyms of Lakshana or signs of diseases). Chaaya is believed to be the reflection of the skin. The same Chaaya when reflected via mirror or light is known as Pratichaaya.

Pancha Mahabhautika description of Chaaya[9]

- Nabhiya Mahabhuta-Blue coloured mild and Sneha+Prabha.
- Vayu-Black/Aruna mixed colour, dry, destroyed colour.
- Agneya-Red and Shuddha, pure as well as presentable Prabha.
- Jaliya-Shuddha as Cats eye gemstone, Snigdha etc.
- Parthiva-Sthira, Snigdha, Ghana, Shlakshana, Krushna/Shvetavarna.

Out of the above the Vayaviya Chaaya is the worst as compared to other Chaaya which are all good. The one which exemplifies Varnain Twacha is Prabha. Prabha is Tejas and is categorized into 7 types i.e., Harita (green), Peeta (yellow), Shveta (white), Krushna (black), Pandura (whitish) and Shyaava (greyish black).[10]

Out of this the Prabha which spreads all over is Snigdha and Vishaala (huge) is Shubha (auspicious) opposite; of which is Ashubha

Bhrajaka Pitta[11]

The Pitta which is located in Twacha is known as Bhrajaka Pitta and the function of which is as follows.

- It digests the medicine applied over the skin i.e.,
Abhyanga, Parisheka, Avgahana and Lepana.[12]

- It exemplifies the *Chaaya*.
- It gives natural colour to the skin.
- Provides lustre to the skin. Provides appropriate amount of heat to the body

Functions of the Skin^{[13][14][15]}

- Protective-Protects from harsh external environment. Provides a barrier against dust germs and other pathogens.
- Control of temperature-Skin participated actively in thermoregulation via the following modes.
 - Conduction, Convection and Radiation are the three modes of exchange wherein the body evaporates 300 to 400ml of water in warm environment.
 - Skin acts as an insulator causing stability in heat dissipation.
 - Skin has heat sensory receptors which via the vasomotor mechanism cause the dilatation of blood capillaries hence causing production of excessive sweat through the sweat pores. In case of cold climate the opposite is true.
 - The hair present on the skin also provides an additive benefit in cold environment for heat preservation.
- General sensation-Skin is major organ which has multiple nerve endings per square inch. These nerve endings provide tactile sensory response and convey the message to our brain. Heat/Cold (calorific sensory response) as well as the pain is also conveyed to the higher centres of the brain.
- Absorption-Many topical medications like steroids, NSAIDS etc. are absorbed from our skin. Skin is water resistant though continuous exposure to water causes swelling of hypodermal layers due to osmosis.
- Excretion-Skin excretes excess of electrolytes and water in the form of sweat. Certain medication and poisonous metabolites are also excreted in small quantities.
- Synthetization- Ergosterol present in the skin is converted into the Vit. D precursor by its hydroxylation under the influence of sunlight.
- Secretion-Skin is responsible for the secretion of mucinous material from sebaceous gland which keeps the skin moist and elastic.
- Water balance-Evaporation of water through the skin is controlled by the skin on the basis of the concentration of water in the body.
- Acid base equilibrium-In case of acidosis the body tends to secrete excess of H⁺ ions via sweat out of the body, hence maintaining the pH of blood.
- Storage-The sub papillary plexus has storage of around 1000ml blood in case of emergency situation. Subcutaneous fat is also responsible for storage of essential fat soluble vitamins (A, D, E, K) etc.
- Gaseous exchange-CO₂ in very small quantities is excreted from skin via sweat.
- It is a seat of *Bhrajak Pitta* which absorbs medicine from *Lepa* etc.
- Skin has 5 types of *Chaaya*, 7 types of *Prabha* and has *Varna Prakashaka* quality.

Body temperature:

According to body Temperature, the animal kingdom is divided into two types viz,

- Warm blooded animals or Homoeother- micorganisms. These types of animals keep their body temperature constant irrespective of the changes in weather or climate.eg-man etc.
- 2.Cold blooded or poikilothermic-These types of animals are unable to keep their body temperature constant and hence their body temperature fluctuates w.r.t climate i.e., during hot climate-body becomes hot and vice versa. Eg-Lizards etc.

- **Average Body temperature of Body.[16]**

The average temperature of body is 98.4°F (97- 99°F) i.e. 36.89°C (36.11-37.2°C). This is the oral temperature. Not much difference is noted in the temperature recorded elsewhere in the body. Axillary temperature is 1°F to 0.55°F less than that of oral temperature whereas the rectal temperature is 0.55 to 1°F more than oral. On the basis of the site of recording the temperature following classification can be made:

- Core temperature where we get a rough estimate of alimentary temperature done via oral/rectal temperature recording.
- Peripheral Temperature-to record the temperature of the peripheral anatomical structures noted via axillary temperature recording.
- **Variation in Temperature:[17][18]**
 - Diurnal variation-Early morning temperature around 5 am is the least variation whereas evening temperature of around 5-7 pm is maximum temperature variation. The difference between the two temperatures is around 1-1.5°F.
 - Age-Children (especially neonates) has underdeveloped heat regulation mechanism causing alteration in the body temperature with reference to environment. Old age on other hand causes reduced body temperature due to sluggish metabolism.
 - Built-Heat convection is directly proportional to the surface area hence more the body size, faster is the tendency to lose heat and vice versa.
 - Diet-Specific Dynamic Action (SDA) causes increase in body temperature after consumption of food (especially protein rich food). According to Ayurveda there is action of *Pachaka Pitta* during *Amla Avasthapaka* causing rise in *Ushma* (one of the *Karma* of *Pitta*).
 - Sex-Normally due to presence of more fat in female and less surface area as compared to males, females have lower body temperature. Their body temperature reaches maximum 24 to 48hrs post ovulation due to calorific action of corpus luteum (by releasing progesterone)
 - Exercise-It increases the body temperature.
 - Atmosphere-Extreme temperature hampers the thermoregulatory homeostasis rendering rapid body cooling or heating.
 - Sleep-Due to reduced muscle action reduction in Temperature occurs.
 - Mental agitation-It can give a rise of even 2°C rise in Temperature.
 - Drug interaction-Certain drugs like morphine, Chlorpromazine etc. Act on CNS and reduce the body temperature. Curare is a drug which causes peripheral muscular palsy causing reduction in temperature. Strychnine on the other hand increases the core temperature of the body. Antipyretic medicine reduces PGE2 synthesis hence reducing prostaglandin threshold in hypothalamus.

- **Regulation Of body Temperature:[19]**

Inspite of human body being subjected to extreme temperatures, it maintains its core body temperature owing to a complex mechanism of heat regulation. To understand this mechanism better, we must first understand thermo genesis, thermolysis and its balance in detail.

- **Thermogenesis**

Chemical interaction which takes place during the process of digestion of complex food material like protein, fats and carbohydrates releases energy in the form of heat due to certain exothermic reactions. Majority of the heat production takes place due to activity of skeletal. The primary mode of heat production is through friction. This is the principle behind shivering when subjected to cold environment. Majority of the heat in our body is produced in liver followed by heart, glandular secretions like

insulin, thyroxine and epinephrine have important role in heat regulation. Various digestive enzymes as well as gut mobility gives off heat. 1g of carbohydrate and protein on breakdown gives 4kcal energy whereas fats give 9 kcal.

• **Thermolysis**

Heat loss from our body takes place via 3 routes i.e skin, lungs, waste products.

Skin wards off heat through conduction, convection and radiation. [20] According to the law of thermodynamics, the loss of heat is directly proportional to the surface area of the body and also the difference between the temperature of our body and cooler environment. The colour of clothes also facilitates heat absorption. For white reflects radiation while black absorbs maximum heat radiation. 55% of heat loss takes place through the medium of the skin.

Heat production and heat loss

25% of the body heat is lost via sweat. Evaporation of body fluid takes place from skin and lungs. There is a large capillary network beneath the skin which continuously supplies fluid in the form of blood. This fluid is evaporated in order to control the body temperature. 2% of the total body heat loss from the body is through lungs. Similarly another 2% of the total body heat is lost from the excretion of macro waste products (stool and urine).

Thermo genesis	Thermolysis
Heat is produced due to digestion, metabolism at both tissue and cellular level.	Radiation 50% Evaporation 30% Conduction and convection- 15% Excretion 2% Lungs 2%

• Regulation of thermotaxis

• **Hypothalamus[21]**

Thermoregulatory centre is located in anterior part of hypothalamus. When nerve ending in the skin are stimulated by heat and cold sensory respond and the signal are conveyed to the Hypothalamus which release it to the subcutaneous papillary plexus, in respond to which they dilate increasing the blood flow and resulting into elevated sweat formation causing heat loss. The posterior part of hypothalamus is responsible for increasing the body temperature, when there is increased heat lost from the body. It achieves this phenomenon by inducing the act of shivering and increasing the secretion of hormones like thyroxin and epinephrine.

• **Spinal cord**

The involvement of spinal cord is similar to that of the bridge which conveys the signal between the thermo receptor of the skin, skeletal muscle, certain hormones producing gland and higher centre of brain (hypothalamus)

• **Endocrine glands effects[22]**

When human body is exposed to cold the anterior pituitary gland releases excess amount of TSH which in turn stimulates the thyroid gland to produce additional amount of thyroxine. Thyroxine increases the BMR result of which heat is produced. Adrenal gland release adrenaline which also increases metabolism, resulting in heat production. The process of conversion of glycogen to glucose which takes place in liver causes heat production.

Peripheral vasoconstriction as well as release of corticosteroids from adrenal gland also increases the heat. Heat regulatory centre in neonates is underdeveloped.

Herbal drugs useful in skin diseases

- *Anjeer (Ficus carica)*[23]
In case of initial stage of *Shvetakustha*, the juice of leaves of *Anjeer* is used for external application.
- *Atibala (Abutilon indicum)*. [24]
The decoction made up of bark and old leaves is used to wash the sunburn.
- *Amaltas (Cassia fistula)*[25]
The paste made up of its leaves is used for local application in leprosy and ringworm.
- *Erandakarkati (Carica papaya)*[26]
Latex of the plant is useful for the treatment of skin changes in gonorrhoea.
- *Eranda (Ricinus communis)*[27]
Decoction made up of its roots is used to wash certain wounds or boils.
- *Atasi (Linum usitatissimum)*[28]
16 part *atasi* mixed with 1 part of mustard seeds is made into poultice form and applied over boils.
- *Tuvaraka (Hydnocarpus indica)*[29]
The oil of seed is used for external application.
- *Khadir (Acacia catechu)*[30]
Used for boils and pustules by mixing it with beeswax. Bath with its decoction is useful in leprosy.
- *Kaner (Nerium indicum)*[31]
Oil made by using the decoction of *Kaner* is used in all types of itching, and other skin ailments.
- *Kampilak (Mallotus Philippinensis)*[32]
It is excellent vermifuge drug, used for treatment of ringworm and infective skin diseases.
- *Kapoor (Cinnamomum camphora)*[33]
12 gm *Kapoor*, 12 gm *catechu* and half gm *Sindoor* are mixed together in vessel into which 120 gm ghee is added. This mixture is washed with water 121 times and applied as a balm on itching skin and gangrenous skin wound.
- *Kalonji (Nigella sativa)*[34]
5 tola *Kalonji*, 5 tola *Bakuchi* seeds, 5 tola *Guggulu*, 5 Tola roots of *Daruharidra*, 2 ½ tola sulphur and coconut oil are mixed together and kept under sun for seven days. This mixture is used for local application.
- *Gunja (Abrus precatorius)*[35]
Used for boils and pustules along with mercury, sulphur, Neem and leaves of *cannabis Sativa*.
- *Chitrak (Plumbago zeylanica)*[36]
The roots is mixed with milk or water and applied over vitiligo patches.
- *Palasha (Butea monosperma)*[37]
It is excellent anti helminthic and vermifuge agent. It is used in all types of infective skin disorder.
- *Tulsi (Ocimum sanctum)*[38]
The paste made from the leaves of *Tulsi* is applied on face to increase its lustre.
- *Nagkesar (Mesua ferrea)*[39][40]
Gangrenous and foul smelling wound which exudes pus are well treated with oil of *Nagkesar*. It improves complexion.

- *Neem (Azadirachta indica)*[41]
Used as antihelminthic and also in *Kushta* and other skin disorder.
- *Bael (Aegle marmelos)*[42]
The leaves are made into small cakes (without using water) and applied on pustules for instant relief.

CONCLUSION-

- The entire article concludes that skin not only protects the internal structure of the body, but its complex structure and function create a unique environment which protects the inner functioning of the body and provides an incredible interface with which to interact with the outside world.
- Skin also acts as a medium for the absorption of various medicines in the form of *Abhyanga*, *Parisheka* etc.
- The thermoregulatory is the other and most important function of the skin.

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