

Conceptual Study of *twak* (skin) from Ayurvedic Chikitsa and Modern Perspective

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Abstract: Skin referred to as *Twak* in Ayurveda, is the outermost covering of the human body and serves as an essential organ responsible for protection, sensation, and maintenance of physiological balance. Skin disorders often reflect underlying internal pathological conditions; therefore, understanding its conceptual and functional aspects is important. Ayurveda has described the structure, functions, and clinical significance of skin since ancient times. This article aims to explore the anatomical, physiological, and functional aspects of skin from both Ayurveda and modern perspectives, with special reference to KriyaSharir and Chikitsa. The role of skin in thermoregulation, sensation, excretion, and overall homeostasis is discussed in detail. The article also highlights the diagnostic importance of skin examination in assessing an individual's health status according to Ayurveda principles. Additionally, commonly used indigenous Ayurveda drugs beneficial in various skin disorders are briefly reviewed. This work attempts to integrate classical Ayurveda concepts with contemporary understanding to provide a comprehensive overview of skin and its therapeutic relevance.

Keywords: Twak, Skin, Ayurveda, Chikitsa, Thermoregulation

I. INTRODUCTION

Structure of Skin

Skin is the outer covering of the human body that protects us from the external environment. It acts as a barrier against physical, chemical, and microbial factors and also helps in sensation and regulation of body temperature. Skin is considered the largest organ of the human body because it covers the entire body surface and performs many important functions necessary for maintaining normal health.

According to Ayurveda, skin (*Twak*) is described as an *Upadhatu* of *MamsaDhatu* (muscle tissue). It is believed to be formed from the metabolic process of *RaktaDhatu* (blood tissue). This process is compared to the formation of cream on milk after it is heated and then cooled. Ayurveda texts mention several synonyms for skin such as *Twak*, *Chavi*, *Chadani*, and *Asrugdhara*. The word *Twak* is derived from *Chhadana*, which means "to cover," indicating its protective nature.

Classical Ayurvedic texts describe different numbers of skin layers. *Charaka Samhita*, *Kashyapa Samhita*, and *AshtangaSangraha* describe six layers of skin, while *AcharyaSushruta* and *Sharangadhara* mention seven layers. The deeper layer called *Mamsadhara* can be compared with the hypodermis or subcutaneous layer described in modern anatomy.

From an anatomical point of view, the skin is divided into two main parts:

1) Epidermis (Outer Skin)

- Avabhasini – similar to the stratum corneum
- Lohita – similar to the stratum lucidum
- Shweta – similar to the stratum granulosum
- Tamra – similar to the Malpighian layer



2) Dermis (Inner Skin)

- a) Vedini – corresponds to the papillary layer
- b) Rohini – corresponds to the reticular layer
- c) Mamsadhara – comparable to the hypodermis (subcutaneous tissue)

Colour of Skin

The colour of the skin depends mainly on pigments present in the skin and blood circulation within small blood vessels. Changes in blood flow in the subpapillary venous plexus may produce pink, bluish, or pale skin appearance. Several factors influence skin colour:

- 1) Melanin: A pigment produced in the basal layer of the epidermis that determines skin colour and protects the skin from harmful ultraviolet rays.
- 2) Melanoid: A derivative related to melanin that helps in absorption of light.
- 3) Carotene: A yellow pigment stored in body fat, usually found in higher amounts in females, and acts as a precursor of vitamin A.
- 4) Oxyhaemoglobin: Oxygen-rich haemoglobin that gives the skin a healthy reddish appearance.
- 5) Reducedhaemoglobin: Oxygen-poor haemoglobin that makes the skin appear bluish or pale, especially in cold conditions.

Skin Lustre :-In Ayurveda, assessment of skin lustre holds significant importance in determining both the diagnosis and prognosis of diseases. The concept of *Chaaya* is closely associated with the *Varna* (complexion) and *Prabha* (radiance) of the skin. Terms such as *Sansthana* and *Akruti*, which are considered clinical indicators or observable signs of disease, are also described as synonymous with *Chaaya*. *Chaaya* is understood as the natural reflection or appearance of the skin, while its reflected image seen through light or a mirror is referred to as *Pratichaaya*.

Panchamahabhoutika Description of Chaaya

Ayurveda explains *Chaaya* based on the dominance of the five Mahabhutas:

Nabhiya (Akashadominant) – Characterized by a light bluish tone associated with unctuousness (*Sneha*) and radiance (*Prabha*).

Vayaviya (Vayu dominant) – Exhibits blackish or reddish coloration, dryness, and a deteriorated appearance.

Agneya (Agni dominant) – Displays a pure, clear, and reddish complexion with brightness and clarity.

Jaliya (Jaladominant) – Appears clean, smooth, and lustrous, comparable to the shine of a cat's-eye gemstone.

Parthiva (Prithvi-dominant) – Characterized by firmness, smoothness, density, and either dark or fair coloration.

Among these types, *VayaviyaChaaya* is considered the least favorable due to its association with dryness and degeneration, whereas the others are regarded as comparatively healthier expressions of skin lustre.

Prabha represents the radiance that enhances and expresses the natural complexion of the skin. It is considered a manifestation of *Tejas* and is classified into seven varieties: *Harita* (greenish), *Peeta* (yellowish), *Shveta* (white), *Krushna* (black), *Pandura* (pale white), and *Shyaava* (grayish-black). When *Prabha* spreads uniformly across the body and appears unctuous and expansive, it is regarded as auspicious (*Shubha*); the opposite condition indicates inauspiciousness (*Ashubha*).

BhrajakaPitta:-The subtype of *Pitta* located in the skin is known as *Bhrajaka Pitta*. It performs several essential functions, including:

Metabolizing substances applied externally to the body such as *Abhyanga* (oil massage), *Parisheka* (pouring therapy), *Avagahana* (immersion therapy), and *Lepana* (topical applications).

Contributing to the manifestation of *Chaaya*.

Maintaining the natural coloration of the skin.

Providing lustre and radiance.

Regulating appropriate heat within the body.



Functions of the Skin

1) Protection

The skin serves as the primary protective covering of the body, safeguarding internal tissues from harmful environmental factors. It acts as a physical barrier against dust, microorganisms, and various external pathogens.

2) Regulation of Body Temperature

The skin plays an active role in maintaining thermal balance through several mechanisms: Heat exchange occurs through conduction, convection, and radiation, during which approximately 300–400 ml of water may evaporate in warm environmental conditions.

The skin functions as an insulating layer that helps maintain stability in heat loss. Thermoreceptors present in the skin detect temperature changes and initiate vasomotor responses. In hot conditions, blood vessels dilate and sweating increases to promote cooling, whereas in cold environments vasoconstriction reduces heat loss.

3) Sensory Function :-The skin contains numerous nerve endings that enable perception of touch, pressure, temperature, and pain. These sensory signals are transmitted to higher brain centres, allowing appropriate responses to environmental stimuli.

4) Absorption:-Certain substances, including topical medications such as steroids and non-steroidal anti-inflammatory drugs (NSAIDs), can be absorbed through the skin. Although the skin is largely water-resistant, prolonged exposure to water may cause swelling of deeper layers due to osmotic effects.

5) Excretion:-Through sweating, the skin eliminates excess water, electrolytes, and small amounts of metabolic waste products. Trace quantities of drugs and toxins may also be excreted via sweat.

6) Synthesis:-Under the influence of sunlight, sterol compounds present in the skin are converted into precursors of Vitamin D through photochemical reactions and subsequent hydroxylation processes.

7) Secretion:-Sebaceous glands of the skin secrete oily substances that maintain moisture, flexibility, and overall skin integrity.

8) Maintenance of Water Balance:-The skin contributes to fluid regulation by controlling transepidermal water loss according to the hydration status of the body.

9) Storage Function:-The subpapillary vascular plexus can act as a temporary reservoir for approximately 1000 ml of blood during emergencies. Additionally, subcutaneous fat stores essential fat-soluble vitamins such as A, D, E, and K.

Body temperature

According to body Temperature, the animal kingdom is divided into two types viz, 1. Warm animals with blood or homoeothermic organisms. These types of animals maintain constant body temperature regardless of weather or climate. eg man changes etc. 2. Cold blooded or poikilothermic. These animal types are unable to keep their body temperature constant and hence their body temperature fluctuates with the w.r.t climate, i.e. the body becomes hot during hot weather and vice versa. E.g.-Lizards and so on. Average body temperature of a healthy individual is approximately 98.4°F (range: 97–99°F), which corresponds to 36.89°C (range: 36.11–37.2°C) when measured orally. Temperature readings obtained from different body sites show slight physiological variations.

Variations in Body Temperature

Body temperature is influenced by several physiological and environmental factors:

Diurnal Variation

Temperature follows a daily rhythm, reaching its lowest level in the early morning (around 5 a.m.) and peaking during the evening (approximately 5–7 p.m.), with a variation of about 1–1.5°F.

Age

Infants and neonates exhibit greater temperature fluctuations due to immature thermoregulatory mechanisms. In contrast, elderly individuals often show slightly lower body temperatures owing to reduced metabolic activity.

Body Build

Heat loss is proportional to body surface area. Individuals with larger surface areas tend to lose heat more rapidly compared to those with smaller surface areas.



Diet and Metabolic Activity

Food intake, particularly protein-rich meals, increases body temperature through specific dynamic action (SDA). From an Ayurvedic perspective, the activity of *Pachaka Pitta* during *Amla Avasthapaka* enhances internal heat (*Ushma*).

Sex Differences

Females generally exhibit slightly lower basal body temperatures due to differences in body composition and surface area. However, body temperature rises 24–48 hours after ovulation because of progesterone secretion from the corpus luteum.

Physical Exercise

Muscular activity increases metabolic rate, leading to elevated body temperature.

Environmental Conditions

Extreme external temperatures challenge thermoregulatory homeostasis, causing rapid heat gain or loss.

Sleep

During sleep, reduced muscular activity results in a mild decline in body temperature.

Drug Effects

Certain drugs influence temperature regulation through central nervous system actions. Medications such as morphine and chlorpromazine may lower body temperature, whereas agents like strychnine increase core temperature. Antipyretic drugs reduce fever by inhibiting prostaglandin (PGE₂) synthesis within the hypothalamus.

Regulation of Body Temperature

1) Thermogenesis

Heat is generated during metabolic processes, especially during digestion of carbohydrates, proteins, and fats through exothermic chemical reactions. Skeletal muscle activity is the major contributor to heat production, and shivering represents an involuntary mechanism that generates heat through rapid muscular contractions in cold conditions.

The liver produces the greatest proportion of metabolic heat, followed by the heart and endocrine activity. Hormones such as insulin, thyroxine, and epinephrine significantly influence heat generation by increasing metabolic rate.

2) Thermolysis

Body heat is dissipated mainly through the skin, lungs, and excretory products. Heat loss occurs through conduction, convection, and radiation via the skin. Around 25% of heat is lost through evaporation of sweat. Evaporation from the lungs contributes nearly 2%, while excretion through urine and feces accounts for another 2% of total heat loss. Heat dissipation depends on body surface area and the temperature difference between the body and surrounding environment. Clothing colour also influences heat absorption; light colours reflect radiation, whereas dark colours absorb more heat.

Thermoregulatory Control Mechanisms

1) Hypothalamus

The primary thermoregulatory centre is located in the anterior hypothalamus. Thermal receptors in the skin detect temperature changes and transmit signals to this centre. In response to heat, vasodilation and sweating are stimulated, promoting heat loss. The posterior hypothalamus activates heat-producing mechanisms such as shivering and increased secretion of hormones like thyroxine and epinephrine during cold exposure.

2) Spinal Cord

The spinal cord functions as a communication pathway, transmitting signals between peripheral thermoreceptors, skeletal muscles, endocrine glands, and higher brain centres involved in temperature regulation.

3) Endocrine System

Endocrine glands play an essential role in thermal balance. Exposure to cold stimulates the anterior pituitary gland to release thyroid-stimulating hormone (TSH), which enhances thyroxine secretion and increases basal metabolic rate, thereby generating heat. The adrenal glands release adrenaline and corticosteroids, which elevate metabolism and promote vasoconstriction, further supporting heat conservation. Glycogen breakdown in the liver also contributes to heat production.



Herbal Drugs Useful in Skin Diseases

Various medicinal plants described in Ayurveda are traditionally used for the management of skin disorders due to their antimicrobial, anti-inflammatory, and healing properties.

- 1) Anjeer (*Ficus carica*) – Leaf juice is applied externally in the early stages of *Shvetakustha* (vitiligo).
- 2) Atibala (*Abutilon indicum*) – Decoction prepared from bark and mature leaves is used to wash sunburned skin.
- 3) Amaltas (*Cassia fistula*) – Leaf paste is applied locally in conditions like leprosy and ringworm.
- 4) Erandakarkati (*Carica papaya*) – Latex of the plant is beneficial in certain infective skin conditions.
- 5) Eranda (*Ricinus communis*) – Root decoction is used for cleansing wounds, boils, and abscesses.
- 6) Atasi (*Linum sitatissimum*) – Paste prepared with mustard seeds is applied as a poultice over boils.
- 7) Tuvataka (*Hydnocarpus* species) – Seed oil is used externally for chronic skin diseases.
- 8) Khadir (*Acacia catechu*) – Applied with beeswax for boils and pustules; decoction baths are helpful in leprosy.
- 9) Kaner (*Nerium indicum*) – Medicated oil prepared from its decoction is useful in itching and various dermatoses.
- 10) Kampilak (*Mallotus philippinensis*) – Acts as a vermifugal agent and is used in ringworm and infectious skin disorders.
- 11) Kapoor (*Cinnamomum camphora*) – Herbal ointment preparations containing camphor are applied for itching and infected wounds.
- 12) Kalonji (*Nigella sativa*) – Herbal formulations prepared with other drugs are used for local application in skin diseases.
- 13) Gunja (*Abrus precatorius*) – Used in compound formulations for boils and pustular lesions.
- 14) Chitrak (*Plumbago zeylanica*) – Root paste is applied over vitiligo patches.
- 15) Tulsi (*Ocimum sanctum*) – Leaf paste enhances skin complexion and improves facial glow.
- 16) Nagkesar (*Mesua ferrea*) – Oil is beneficial in foul-smelling wounds and helps improve complexion.
- 17) Neem (*Azadirachta indica*) – Widely used for *Kushta* and other skin disorders due to its antimicrobial action.

II. CONCLUSION

- 1) The present review highlights that the skin is not merely a protective covering of the body but a structurally and functionally complex organ. It maintains internal physiological stability while serving as an essential interface between the body and the external environment.
- 2) The skin also functions as an effective route for the absorption of therapeutic substances, particularly in Ayurvedic procedures such as *Abhyanga* and *Parisheka*, thereby contributing to systemic therapeutic effects.
- 3) Among its various roles, thermoregulation remains one of the most significant functions of the skin, helping maintain body temperature and overall homeostasis.

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