

STRUCTURAL ANATOMY OF SKIN (*TWACHA*) IN AYURVEDIC AND MODERN SCIENCES

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ABSTRACT

Skin is the largest organ of the human body and serves as the primary interface between the internal and external environment. In Ayurveda, skin is described as *Twacha*, an *Upadhatu* of *Mamsa Dhatu*, formed during embryogenesis and composed of multiple layers, each with specific structural and functional significance. Modern science explains skin as a complex organ consisting of epidermis, dermis and hypodermis with well-defined histological layers. This article attempts a comparative and integrative review of the structural anatomy of skin as described in Ayurvedic classical texts and modern anatomy, highlighting similarities, differences and clinical relevance.

KEYWORDS: *Twacha*, Skin, Ayurvedic anatomy, Modern anatomy, Layers of skin.

INTRODUCTION

Skin plays a vital role in protection, sensation, thermoregulation, metabolism and immunity. Ancient Ayurvedic scholars recognized the importance of skin not only as a physical covering but also as a site of *Dosha* manifestation, disease expression and therapeutic intervention (*Abhyanga*, *Lepa*, *Basti*, *Agnikarma*, etc).

Acharya Sushruta particularly elaborated the *Sapta Twacha* concept, which demonstrates a remarkable understanding of layered skin organization.^[1] Modern science explains skin based on histological and microscopic structures.^[2] Modern anatomical and histological descriptions

confirm that skin is a multilayered organ composed of epithelial and connective tissue layers with specialized appendages.^[3] Understanding both perspectives is essential for a holistic approach to dermatology and systemic diseases.

Concept of Twacha in Ayurveda

Utpatti (Origin) of Twacha - On the Basis of Suhruta Sharira 4/4

“तस्य खलु एवं प्रवृत्तस्य शुक्रशोणितस्याभिपच्यमानस्य क्षीरस्येव सन्तानिकाः सप्त त्वचो भवन्ति ।”

This verse explains the embryological origin of **Twacha (skin)** in Ayurveda. Acharya Sushruta states that when the combined *Shukra* (sperm) and *shonita* (ovum) undergo metabolic transformation (*abhipachana*) during embryonic development, seven distinct layers of skin are formed. The process is compared to the formation of successive layers of cream on heated milk. Just as multiple thin layers appear gradually on the surface of boiling milk, the skin develops in seven sequential layers during fetal growth.

This analogy emphasizes the gradual, organized, and layered development of *Twacha* from the primordial reproductive elements. Thus, in Ayurvedic embryology, the skin is considered a product of the processed essence of *shukra* and *shonita*, formed during intrauterine development and structured into seven anatomical layers (*Sapta Twacha*).

Definition and Formation of Twacha

The term *Twacha* is derived from the root “*Twak Samvarane*” meaning covering or enveloping. Acharya Charaka explains that *Twacha* is formed during intrauterine life as a result of the processing of *Mamsa Dhatu* by its *Dhatvagni* and is nourished by *Rakta* and *Mamsa* indicating its structural derivation and nourishment.^[4] Charaka describes *Twak* as the seat of *Sparshanendriya* (organ of touch perception), highlighting its sensory function. Acharya Sushruta describes *Twacha* as being formed similarly to cream (*Santanika*) over milk during heating, indicating gradual differentiation and layering.

Layers of Twacha (*Sapta Twacha*)

Acharya Sushruta provides the most detailed description of the seven layers of skin, each having specific thickness, functions and disease associations.

1. *Avabhasini*

- Outermost layer
- Reflects complexion (*Varna*), glow (*Prabha*) and luster

- Site of diseases like *Sidhma*, *Padmakantaka*
- Comparable to Stratum corneum & superficial epidermis

2. *Lohita*

- Associated with *Rakta*
- Involved in pigmentation and inflammatory conditions
- Site of *Tilakalaka*, *Nyachchha*
- Correlates with stratum lucidum/granulosum

3. *Shweta*

- Pale in appearance
- Site of diseases like *Charmadala*
- May correspond to deeper epidermal layers

4. *Tamra*

- Coppery in colour
- Important in skin metabolism
- Site of *Kilasa*, *Kushtha*
- Comparable to basal layer and dermo-epidermal junction

5. *Vedini*

- Rich in sensory perception
- Responsible for pain and touch sensation
- Site of *Visarpa*
- Correlates with papillary dermis and nerve endings

6. *Rohini*

- Responsible for healing and regeneration
- Site of *Granthi*, *Arbuda*
- Comparable to reticular dermis

7. *Mamsadhara*

- Deepest layer
- Supports muscles and deeper structures
- Site of *Bhagandara*, *Vidradhi*
- Comparable to subcutaneous tissue (hypodermis)

***Panchabhautika* Composition**

Twacha is composed of

- *Prithvi* – Structural firmness
- *Ap* – Moisture
- *Teja* – Complexion and metabolism
- *Vayu* – Sensation
- *Akasha* – Porosity

Structural Anatomy of Skin in Modern Science

Modern anatomy divides skin into three principal layers, each with distinct histological features.

1. Epidermis^[5]

- Outermost epithelial layer
- Avascular, stratified squamous epithelium
- Composed of five strata.
 - Stratum basale
 - Stratum spinosum
 - Stratum granulosum
 - Stratum lucidum (thick skin)
 - Stratum corneum

Functions

- Barrier protection
- Prevention of water loss
- Pigmentation (melanocytes)

2. Dermis^[6,7]

- Middle connective tissue layer
- Rich in blood vessels, nerves, glands, and hair follicles
- Divided into.
 - Papillary dermis
 - Reticular dermis

Functions

- Sensation
- Thermoregulation
- Mechanical strength
- Wound healing

3. Hypodermis (Subcutaneous Tissue)^[8]

- Deepest layer
- Composed of adipose tissue and connective tissue

Functions

- Insulation
- Energy storage
- Shock absorption
- Anchors skin to underlying structures

Comparative Analysis of Twacha and Modern Skin

Ayurvedic Layer	Functional Correlation	Modern Equivalent
<i>Avabhasini</i>	Complexion and glow	Stratum corneum
<i>Lohita / Shweta</i>	Pigment and epidermal metabolism	Epidermal layers
<i>Tamra</i>	Dermo-epidermal interaction	Basal region
<i>Vedini</i>	Sensory perception	Papillary dermis
<i>Rohini</i>	Healing	Reticular dermis
<i>Mamsadhara</i>	Structural support	Subcutaneous tissue

Clinical Significance**Ayurvedic Perspective^[9]**

- *Twacha* reflects *Dhatu Sara*, especially *Rasa* and *Rakta*
- Used for diagnosis of *Dosha* imbalance
- Skin diseases (*Kushtha*) involve all seven layers.
- *Rakta Dushti* directly affects *Twacha*.
- *Bhrajaka Pitta* governs topical drug absorption.
- Basis for therapies like.
 - *Abhyanga*
 - *Udvartana*
 - *Lepa*
 - *Raktamokshana*

Modern Perspective^[10,11,12]

- Skin examination aids in diagnosis of systemic diseases
- Site for transdermal drug delivery
- Important in cosmetic and reconstructive medicine
- Epidermal disorders: Psoriasis, Vitiligo
- Dermal disorders: Eczema, Dermatitis
- Subcutaneous disorders: Lipoma

Integrative Understanding**Ayurveda emphasizes**

- Functional layers
- *Dosha-Dhatu* relation
- Systemic approach

Modern science emphasizes

- Histology
- Cellular pathology
- Molecular mechanisms

An integrative approach helps in

- Cosmetic dermatology
- Wound healing
- Autoimmune disorders
- Pigmentation disorders

DISCUSSION

The seven-layered description by Sushruta reflects a sophisticated understanding of structural and functional stratification. While modern anatomy divides skin into three major layers, histologically these further subdivide, which may correspond conceptually to Ayurvedic layers. Although Ayurveda and modern science differ in terminology and methodology, both systems recognize skin as a multilayered, multifunctional organ performing protective, sensory and metabolic functions. Ayurvedic descriptions are functional and disease-oriented, while modern anatomy is structure and histology oriented. Integrative interpretation enhances interdisciplinary dermatological understanding.

CONCLUSION

The structural anatomy of skin described in Ayurveda as *Twacha* shows remarkable conceptual parallels with modern anatomical descriptions. The *Sapta Twacha* concept described in Ayurveda demonstrates advanced anatomical insight correlating broadly with modern skin layers. *Twacha*, as described in Ayurveda, is a multi-layered, functional organ intricately connected to *Rakta* and *Mamsa Dhatu*, with seven structural levels. Modern anatomy provides detailed histological classification into epidermis, dermis and hypodermis. Both systems offer valuable insights and their correlation enhances dermatological understanding. Integrating Ayurvedic wisdom with modern scientific knowledge enhances diagnostic accuracy and therapeutic effectiveness, especially in dermatological and systemic disorders.

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