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Conceptual Study of *Twacha* (Skin) *Sharir* Ancient and Modern View.

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ABSTRACT:

Ayurveda is most ancient Indian medical system, based on ancient writing. It is “Science of Life”, which deal with wealth of medical sciences. The descriptions of the *Ayurveda* sages *Charaka* (500 B.C.) and *Sushruta* (600 B.C.) in classical *Ayurveda* are compared with contemporary, conventional anatomy. In *Ayurvedic* oldest text *Sushruta Samhita Shareer sthana* has mentioned five sensory organs i.e. *Gyanendriyas*, *Sparshanendriya* is one of them whose *adhishthana* is *Twacha* (skin). As we know, skin is the largest sense organ of the body which sense touch, pain, pressure, temperature etc. skin is play role in “The First Line of Defence” mechanism. This detailed study of *Twacha Sharir* in both *Ayurvedic* and *Modern* sciences provided well established concept of *Twacha*(skin). Thus, in medical science, for better diagnosis, detailed study of *Twacha* as per *Ayurveda* in *Rachnatmaka* and *Kriyatmaka* aspect as well as *Modern* concepts are necessary

Key words; *Twacha*, *Updhatu*, *Mamsa*, *Dhatu*

INTRODUCTION

The skin is the largest organ of the body, accounting for about 15% of the total adult body weight, with a total area of about 20 square feet and weighs 4.5-5kg, about 7% of total body weight.¹

Acharya Charaka defines skin as the structure covering the whole body. They consider six layers of skin, *Acharya Sushruta* has stated that the thickness of *twacha* is different in different sites of body as in *mansalsthaana* and *lalaat* the *twacha pramaan* varies. They consider seven layer of skin. *Modern* science also stated the same concept that skin is thickest on palms and soles of feet while thinnest on eyelids and in post auricular region. We know well about the skin but the details of *Twacha* mentioned in various *Ayurvedic* Texts are yet to be explained. The knowledge of

Rachnatmaka and *Kriyatmaka* aspect of *Twacha* is of great importance as *Twacha* is the seat for various *Rogas*.²

AIMS AND OBJECTIVES

1. To described various *Ayurvedic* and *modern* literatures which is mention in different text i.e *Charak samhita*, *Susrutha samhita*, *Astang samgrah*, *Astang hrudyam*, *Sarangdhar samhita* etc .
2. To establishment of definitive correlation between *Ayurvedic* and *modern* text.
3. To establish *twacha* (skin) as diagnostic and prognostic tools in *Ayurvedic* and *modern* practices



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MATERIAL AND METHODS:-

The review work done by the help of different *Ayurvedic samhita*, such as *Charak samhita*, *Susrutha samhita* and modern text book also help by contemporary text including website. The study of skin carried out by the dissection of dead human body and layer of skin was found by microscopic study. The thickness of skin is study by observation and measured by caliper and ultrasound scanner.

Etymology (nirukti) of *twacha* (skin)^{3,4}

In *Ayurveda*, skin is stated as *Twak* or *Twacha*. It is included under “*Panch Gyanendriya Adhithana*.” It has a great capacity of expansion and stretching. *Twacha* is the *adhithana* of “*Pranadi Panch Vayu*” where *Vayu* resides and bring out its functions. *Twacha* is specialized sense organ which acquires special sensory perception of pain, touch, pressure, heat and cold.

Synonyms for *twacha*

Skin is known by various names like *Derma*, *Dermis*, *Twacha*, *Charma*, *Sparshan*, *Chavi*, *Chadani*, *Asrugdhara*, *Romabhumi*, *Ajin*, *Kruti*.

Twacha utpatti

Acharya Sushruta described the development of *Twacha* in *Shareersthana* by taking the example of *Ksheer* and *Santanika*. *Twacha* develops like a layer of *Santanika* (cream) developed on *Ksheer* (Milk) after heating. The formation of *Twacha* results from heat generated in the process of union of *Shukra* (semen) and *Shonita*(ovum) during the *Garbhanirmaana Kala*(foetal development period).⁵

Acharya Charaka states that development of the *twacha* results from the *shukra shonita sanyoga* and the formation of all *sapta dhatu*.

According to *Acharya Charaka*, the six layers of the *Twaka* (skin) are formed from the *Mamsa Dhatu*.⁶

Acharya Vagbhata states that the development of *Twacha* (skin) occurs due to *paka* of *Rakta dhatu* by *dhatvagni*.

In Modern texts, it is stated that the development of skin starts after gastrulation at about fourth week after the fertilization. Epidermal development in mammals is a multi-step process consisting of: epidermal specification, commitment, stratification, terminal differentiation, and growth of epidermal appendages. Each step of epidermal development is closely tied to the development of the dermis and the underlying mesenchyme, with differences in the dermis. The ectoderm gives rise to both the nervous

system and skin epithelium.

Layers of Skin - Table 1 *Charaka* mentioned six layers of skin, he was not mention the name of these layers.⁷

Vagabhata mentions only figure of the layers but not nomenclature them. He is *Arunadutta* who nomenclature the seven layers in commentary of same. *Acharya Bhela* follows the pattern of *Charaka* for description of the layers of the skin. *Sharangadhara*, *Arunadutta* and rest worker follow the *Sushruta*’s pattern for the description of layers of the skin. The modern histological study of the skin reveals that there are seven layers of the skin.

MODERN CONCEPT OF SKIN⁸

Structure of the skin

Two main parts:

- I. **Epidermis**
Superficial, thinner, epithelial tissue. The epidermis is a stratified, squamous epithelium layer that is composed primarily of two types of cells: keratinocytes and dendritic cells. The keratinocytes differ from the “clear” dendritic cells by possessing intercellular bridges and ample amounts of stainable cytoplasm. The epidermis contains a number of other cell populations, such as melanocytes, Langerhans cells, and Merkel cells. Mainly five layers of epidermis
 - A. Keratinocytes- They make the protein keratin (a tough, protective protein). The most numerous cell type: about 90% of the epidermal cells.
 - B. Melanocytes - About 8% of the epidermal cells. Make the protein pigment melanin. Responsible for skin color, absorbs ultraviolet light.
 - C. Langerhans cells - Immune cells located in the epidermis.
 - D. Merkel cells -associated with touch.
Most areas of the body have four strata or layers. This is referred to as thin skin. In some areas of the body exposed to greater friction, like the fingertips, palms and soles of the feet the epidermis has five strata or layers. This is referred to as thick skin.
 - I. Stratum basale or Germinativum
 - Inner most layer
 - Rest on basement membrane
 - A single layer of cuboidal or columnar keratinocytes
 - Mitotically active layer
 - II. Statum spinosum- Just above the S. basal, Several layers (8-10) of spiny shped cells.
 - III. Statum granulosam- Just abone S. spinosum. 3-5 layers of flattened keratinocytes.
 - IV. Statum lucidum- only present on thick skin. 3-5 layers of

clear dead keratinocytes, contain large amount of keratine

- V. Stratum corneum – 20- 30 layers of flattened dead keratinocytes. Outermost layer of epidermis

Dermis

Deeper, thicker, connective tissue. The dermis is an integrated system of fibrous, filamentous, and amorphous connective tissue. Epidermal derived appendages, fibroblasts, macrophages, and mast cells, lymphocytes, plasma cells, and other leukocytes, enter the dermis in response to various stimuli as well. The dermis provide mass of the skin and provides its pliability, elasticity, and tensile strength. It protects the body from mechanical injury, binds water, aids in thermal regulation, and includes receptors of sensory stimuli.

The two layers are attached by the basement membrane. The constituents of the dermis are mesodermal in origin. The principal component of the dermis is collagen, a fibrous family of proteins with at least 15 genetically distinct types in human skin.⁹

Subcutaneous layer

Also called the hypodermis, deep to the dermis, but not part of the skin, consists of areolar and adipose tissues, attaches skin to underlying tissues and organs.

Correlation of layers of *twacha* (skin)

The details regarding the layers of skin according to Ayurveda and Modern science are which is mentioned by Ghanekar,

- *Avabhasini*- Stratum corneum
- *Lohita*- Stratum Lucidum
- *Shveta*- Stratum Granulosum
- *Tamra*- Malpighian Layer
- *Vedini*- Papillary Layer
- *Rohini*- Reticular Layer
- *Mamsadhara*- Subcutaneous tissues

Description of skin layers according to Charaka- Table 2

Description of skin layers according to Sushruta-Table 3

Epidermal appendages of skin

- a) Eccrine sweat glands
- b) Apocrine Sweat Glands
- c) Apoeccrine Sweat Glands
- d) Hair Follicles
- e) Sebaceous Glands
- f) Nails

Functions of skin¹⁰

1. Thermoregulation
2. Blood Reservoir: The dermis houses an extensive network of blood vessels that carry 8- 10% of the total blood flow in a resting adult. For this reason, the skin acts as a blood reservoir.
3. Protection: The skin protects the body in various ways. Keratin protects underlying tissues from microbes, abrasion, heat and chemicals
4. Cutaneous sensations
5. Excretion and absorption: Despite the waterproof nature stratum corneum, about 400mL of water evaporates through skin daily. Fat soluble vitamins (A,D,E,K), certain drugs and few gases do enter and exit the skin.
6. Synthesis of Vitamin D

Clinical conditions

In *Ayurvedic* Literature, skin diseases are described under “*KusthaRoga*”. These are of two types-

- a) *Maha Kustha*

- b) *Chhudra Kustha*

In Modern Literature, variety of skin disorders have been discussed. Some are:

Skin lesions and eruptions: Several skin lesions are observed in various dermatological disorders.

RESULT

With the help of instruments and literary review we find that layers of *twacha* (skin) is almost same as ancient and modern view. The layer of *twacha* (skin) according to *Acharya susruta* is near to modern view. The outer most *Avabhasini* outer most layer equivalent to statum corneum, second *Lohita* is equivalent to statum lucidium, third layer *Shveta* is equivalent to stratum granulosum, fourth layer *Tamra* is equivalent malpighian layer, fifth layer *Vedivi* is equivalent to papillary layer, sixth layer *Rohini* is equivalent to reticular layer and seventh inner most layer *Mansdhara* is similar to subcutaneous layer. Skin is the barrier of first line of defense mechanism. Main site of touch, pressure and pain. The skin is responsible for all types of pigmentation (*varna*), *chhaya* and shadow (*prabha*).¹¹

DISCUSSION

Ayurveda is an ancient & holistic system of medicine. Ayurveda describes seven distinct layers of the skin, each with its own structure and function. The layers are designed so that each layer provides support to the layers above it.

The skin as a whole is able to effectively perform its overall functions when all the layers are healthy and balanced. In Samhitas *Twak/Twacha* is described as outermost protective layer of body as well as largest sensory organ of body. Acharya Sushrut and Acharya Charak very minutely described its layers according to their functions and also diseases which are related to those layers. In Ayurvedic classics, various opinion regarding *twacha uttapati*, *twacha stara* and associated disorders are mentioned. Our skin is our largest organ.” Acharya Sushruta has mentioned five sensory organs i.e. *Gyanendriyas*. *Sparshanendriya* is one of them whose *adhishthana* is *Twacha* (skin). As we know, skin is the largest sense organ of the body which sense touch, pain, pressure, temperature etc. It is also known as “The First Line of Defense”. *Twacha* is considered as *updhatu of mamsa dhatu*. “In Ayurveda, skin is considered a manifestation of inner health. Our skin is our largest organ.” Several concepts about *Twacha* are also quite useful in diagnosis and treatment of many disorders. The outer most layer *Avabhasini* (described by *Acharya Susrutha*) is responsible for pigmentation and all forms of *chhaya*. According to *Acharya Charak* there are three types of *varna* (pigmentation) i.e *Krishna*, *shyav* and *shyavadat* and seven types of *prabha* (shadow) i.e *rakta*, *pitah,sitah*, *shyava*, *harit*, *pandur* and *asitah*. The site of psoriasis, pimples and acne are *Avbhasini*. *Lohita* supports the outermost layer and site for moles, dark circles and black pigmentation. *Shweta* is site for atopic dermatitis, boil and blister. Fourth *Tamra* is site for leprocy., which connects to the dermis’s malphagian layer and support the immune system. In the fifth layer *Vedini* is site for leprosy and herpes which connect papillary layer of dermis. Sixth layer *Rohini* are site of goitor, cancer and cysts also promote healing and regeneration. Inner most *Mansdhare* are site for fistula, piles and abscess which gives stability and hardness of skin. There are many thought on layer of *twacha* (skin). Coloration of *Twacha* (skin) by *bhrajakpitta* is *Twacha* (Skin) acts as barrier so try to protect them from external harmful substances such as sun light burn, heat burn, excessive hot and cold environment.

CONCLUSION

This detailed study of *Twacha Shareer* in both Ayurvedic and Modern sciences provided well established concept of *Twacha* (skin) in medical science. Abnormalities of *twacha* (skin) can be diagnosed by mainly observation no need of investigation. *Twacha* (skin) play important role in first line of defense mechanism, so observe carefully of skin during examination for change in color and textures. To know about the *Vikriti* of *Twacha*, it is necessary to know the normal physiology i.e. *Prakriti* of the *Twacha*. Thus, in

medical science, for better diagnosis, detailed study of *Twacha* as per *Ayurveda* in *Rachnatmaka* and *Kriyatmaka* aspect as well as Modern concepts are necessary.

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Table 1 Charaka mentioned six layers of skin, he was not mention the name of these layers.

Modern	Sushruta	Charaka / Bhela	Vagabhata	Arundatta	Sharangdhara
Epidermis	<i>Avabhasini</i>	<i>Udakadhara</i>	<i>udakadhara</i>	<i>Bhasini</i>	<i>basi ni</i>
	<i>Lohita</i>	<i>Asrukdhara</i>	<i>Asrukdhara</i>	<i>Lohita</i>	<i>Lohita</i>
	<i>Sweta</i>	3 rd	3 rd	<i>Sweta</i>	<i>Sweta</i>
	<i>Tamra</i>	4 th	4 th	<i>Tamra</i>	<i>Tamra</i>
Dermis	<i>Vedini</i>	5 th	5 th	<i>Vedini</i>	<i>Vedini</i>
	<i>Rohini</i>	6 th	<i>Pranadhara</i>	<i>Rohini</i>	<i>Rohini</i>
	<i>Mamsadhara</i>	-----	-----	<i>sadhara</i>	<i>Sthula</i>

Table 2 Description of skin layers according to Charaka

S.No.	Skin layer	Functions	Diseases
1	<i>Udakdhara</i>	Holding the water	Dehydration, wrinkles
2	<i>Asrukdhara</i>	Holding the water	Nonelevated mole (<i>Tilakalaka</i>), <i>Naevi</i> (<i>Nyacha</i>) and capillary <i>angiona</i> (<i>Vyanga</i>)
3	Seat of <i>Sidhma</i> (dermatitis) and <i>Kilas kushta</i> (leucoderma or vitiligo)	Possible function is pigmentation and immunity/ protection	Pityriasis versicolor or <i>Tinea versicolor</i> (<i>Sidhma</i>) and <i>Vitiligo</i> (<i>Kilas kushta</i>)
4	Seat of <i>Dadru</i> (Ringworm or <i>Tinea corpora</i>) and <i>Kushtha</i> (Hansens disease / leprosy)	Possible immune function against chronic infections	<i>Tinea corporis</i> or ring worm (<i>Dadru</i>) and Hansen’s disease or leprosy (<i>Kushtha</i>)
5	Seat of <i>Alaji</i> (boil) and <i>Vidradhi</i> (abscess)	Possible immune functions against acute infections	A type of boil (<i>Alaji</i>) and abscess (<i>Vidradhi</i>)
6	Seat of boils, appearing blackish- red and deep rooted on joints	Related to life or consciousness	Pain in case of injury

Table 3 Description of skin layers according to Sushruta

S. No	Skin layer	Functions	Diseases	Thickness Brihi / mm
1	<i>Avabhasini</i>	Reflecting the health of the individual and maintaining health of deeper layers and of the interstitial, nutrient fluid called <i>rasa dhatu</i> Illuminates all shades of the skin	Pityriasis vesicular (<i>Sidhma</i>) and <i>padmakantak</i> considered as papilloma	1/18 th / 0.05 -0.06
2	<i>Lohita</i>	Supporting the outer layer and indicates the quality of blood	Nonelevated mole (<i>Tilakalaka</i>), Naevi (<i>Nyacha</i>) and capillary angioma (<i>vyanga</i>)	1/16 th / 0.06-0.07
3	<i>Shweta</i>	Balancing the color of the skin	<i>Charmadala</i> , <i>Ajagallika</i> and <i>mashaka</i>	1/12 th / 0.07-0.08
4	<i>Tamra</i>	Nurturing and protecting the	Leprosy (<i>Kushtha</i>) and erysipelas (<i>visarpa</i>)	1/8 th / 0.12-0.15
5	<i>Vedini</i>	upper layers Sensation	Leprosy (<i>Kushtha</i>) and Vitiligo (<i>Kilasa</i>)	1/5 th / 0.20-0.50
6	<i>Rohini</i>	Healing and regeneration	Sebaceous cyst (<i>Granthi</i>), lymphadenitis (<i>apachi</i>), tumor (<i>arbuda</i>), filariasis (<i>shlipada</i>) and goiter (<i>galaganda</i>)	1 / 1.0-1.10
7	<i>Mansadhara</i>	Skin to appear firm and supple	Fistula (<i>Bhagandar</i>), abscess (<i>vidradhi</i>) and Piles (<i>arsha roga</i>)	2 / 2.0-2.10