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The physiological study of *Twak Upadhatu* w.s.r. to Skin

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ABSTRACT

In *Samhitas Twak/Twacha* is described as outermost protective layer of body as well as largest sensory organ of body. According to *Acharya Charaka*, *Twacha* is the *Mula* of *Mansavaha Srotas* and *Updhatu* of *Mansadhatu*. *Acharya Sushruta* and *Acharya Charak* very minutely described its layers according to their functions and also diseases which are related to those layers. Modern health science described skin in detail according to division of cell. Skin, the largest organ of human body, holds significant importance in maintaining normal human physiological condition. The conceptual aspect of skin needs to be understood because skin disorder is outer exhibition of some kind of internal pathology. The ancient science of *Ayurveda* has noted its features ages back. *Ayurveda*, the "Science of Life", is a real wealth of medical sciences. In *Ayurvedic* oldest text *Sushruta Samhita- Shareer sthana*, *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". *Ayurveda* is real wealth of medical sciences which gives preference to prevention of health in healthy person and provides best treatment to diseased one. It believes in complete elimination of root cause of disorder rather than short-term relief. Skin is the largest and first site visible organ of body which acquires 1.5-2 square meter surface area of the body. It is not merely protecting covering but it is reflection of the internal system of the body.

Key words: *Twak, Upadhatu, Skin.*

INTRODUCTION

Skin is called "*Twak*" which covers the whole body. Today whole world is familiar about most of the modern concepts about skin, but still many concepts about *Twacha* (Skin) mentioned in various *Ayurvedic* Text is yet to disclose. In this study an attempt is

made to explore the hidden concept about *Twacha Sharir* such as formation and development of skin (*Twacha Utpatti*), skin layers with associated disorder (*Twacha Stara & Roga-Adhishthana*), Physiological aspect of skin (*Dosha, Dhātu & Mala Sambandha of Twacha*), Relation of skin with soul (*Atma*) and mind (*Mana*). *Twacha* as diagnostic tool in clinical aspects & *Twacha* serving as prognostic tool. All above mentioned concepts should be enlighten, So that *Ayurveda's* glory and respect in society will be revitalize by clarifying doubtful opinions and proving the principles described by our *Maharishis*. *Acharya Charaka* defines skin as the structure covering the whole body. *Acharya Sushruta* has stated that the thickness of *Twacha* is different in different sites of body as in *Mansalasthaana* and *Lalaat* the *Twacha Pramaan* varies. 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.

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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*. Sensory organs (*Gnyanendriyas*) mean which those organs which receive the knowledge through their location (*Adhistanas*). *Twak* (skin), *Jivha* (tongue), *Nasa* (nose), *Akshi* (eye), *Karna* (ear) these are five Sense Organs. *Shabda* (voice), *Sparsh* (touch), *Rupa* (vision), *Rasa* (taste), *Gandha* (smell) are five subjects of those sensory organs (*Tanmatras*). *Twacha* (skin) is one of the five sensory organs which helps to determine the touch sensation and covers whole body, and it is also a location (*Ashray Sthana*) of sweat channels (*Swedvahi Srotas*), hairs (*Loma*), hair pits (*Lomkupas*). It is the largest organ constituting 15 -20% of total body mass. Skin is known as “The First Line of Defense” as it protects us from microbes and other invading elements. It is a part of integumentary system that contributes to homeostasis by protecting the body and helping regulate body temperature. It also allows us to sense pleasurable, painful and other stimuli in the external environment.

MATERIALS AND METHODS

Twacha Utpatti

In *Ayurvedic* texts, it is stated that the development of *Twacha* (skin) occurs in *Tritiya Masa* (third month) of intrauterine life. *Twacha Uttapati* formation and development of *Twacha* is took place during the “*Garbhaniirmati*” i.e. Process of formation and development of *Garbha*. *Twacha Uttapati* in *Brihatrayee* the whole process of formation of *Twacha* is compare with formation of creamy layer over the surface of milk, when it is boiled and allowed to cool down, formation of thick layer of skim take place which is explained as “*Ksheerat –Santanika*”. Different *Acharyas* have different views regarding the development of *Twacha*.

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* and *Shonita* during the *Garbhanirmaana Kala*.

Acharya Charaka states that development of the *Twacha* results from the *Shukra Shonita Sanyoga* and the formation of all *Sapta Dhatu*.

Acharya Vagbhata states that the development of *Twacha* occurs due to *Paka* of *Rakta Dhatu* by *Dhatvagni*.

In Modern texts, it is stated that the development of skin starts at about fourth week after the fertilization.

Indu in his commentary “*Shashilekha*” explains the appearance and arrangement of skin layers by giving an illustration of *Kadalidal* i.e. Stem of Banana, which has several layers that are arranged in systematic concentric manner. He states that *Twacha* is formed from the *Sara Bhaaga* (*Prasaad*) of *Rakta Dhatu*, shiny and lustrous appearance of skin is due to *Rakta Dhatu*.

Hemadri in his commentary “*Ayurved Rasayan*” depicts that whole body is “*Panchmahabhautik*” and *Twacha* is formed by metabolization of *Rakta dhatu* by its own *Dhatwagni*, several layer of *Twacha* are formed over outer surface of embryo.

According to *Bhavaprakash* *Twacha* is formed by *Pachan* that is metabolization of *Shukra* and *Rasa Dhatu*.

Synonyms for *Twacha*

Twacha, *Charma*, *Sparshan*, *Chavi*, *Chadani*, *Asrugdhara*, *Kruti*, *Ajin*, *Dehacharma*, *Romabhumi*, *Shariravaranam*, *Asrugvara*, *Shariravarakam Shastram*.

Twacha Uttapati Kala

Charak describes *Bala-Varna-Upachaya* in sixth month of intrauterine life, As *Varna* complexion is the attribute of skin it is clear that *Twacha* is formed in sixth month of intrauterine life.

According to *Astang Sangraha* & *Hridya Uttapati* of *Kesha*, *Roma*, *Nakha*, *Asthi*, *Snayu*, *Bala*, *Varna*, *Sira* and *Twacha* develops in sixth month of intrauterine of life.

As per modern all layers of skin is formed in fourth month of intrauterine life.

Types

Acharya Sushruta mentioned the concept of *Twacha* in *Shareera Sthana* as *Twacha* has seven layers;

SN	Name	Parmaan (measurement)	Twakroga Adhishtana
1.	Avabhasini	1/18th part of Vrihi (rice grain)	Sidhma (small ulcers) and Padmakantaka (<i>Pemphigus mollaceus</i>)
2.	Lohita	1/16th part of Vrihi	Tila Kaalaka (moles), Nyachchha (pimples) and Vyanga (<i>Acne vulgaris</i>)
3.	Shweta	1/12th part of Vrihi	Charamdala, Ajagalli and Mashaka (taenia infection of skin and candidiasis)
4.	Tamra	1/8th part of Vrihi	Vividha Kilasa (lepromatous) and Kustha (tuberculoid leprosy)
5.	Vedini	1/5th part of Vrihi	Kushtha (leprosy) and Visarpa (erysipelas)
6.	Rohini	which measures about a Vrihi	Kushtha (leprosy) and Visarpa (erysipelas).
7.	Mansadhara	which measures about two Vrihi	Bhagandara (fistula-in-ano), Vidradhi (abscess), Arshas (piles)

Acharya Charaka mentioned six layers of *Twacha*

SN	Name	Twakroga Adhishtana / Karma
1.	Udakadhara	holds the Udakdhatu
2.	Asrikdhara	which carries Rakta
3.	Tritiya Twacha	Sidhma kilasa
4.	Chaturthi Twacha	Dadrुकushtha means light elevation in the skin (macular rash)

5.	Panchami Twacha	Alajivradhi
6.	Shashthi Twacha	Tamahpravisyati, Arushika

Sharir Kriya aspect

Sharir Kriya aspect of *Twacha* to examine the role of skin, we will have to assess the effects of *Dosha*, *Dhatu* and *Malas*.

Role of Vata Dosha in Twacha

Vata Dosha Vrddhi in the body results in *Karshanyam* (hyperpigmentation) of *Twacha*.

Role of Pitta Dosha in Twacha

Prakrat Karma	Kshaya	Vrddhi
lusture of the twacha	loss of lusture of the twacha	yellowish discoloration of the twacha

Role of Kapha Dosha

Kshaya	Vrddhi
Rukshata (dryness)	Shaukalyam (whitish discoloration) and Shaityam (coldness of Twacha)

Role of Dhatu

Rasa and Rakta Dhatu are indirectly related to *Twacha*. Vitiation of *Rakta Dhatu* leads to skin diseases like *Visapra*, *Kustha*, *Vyanga* etc. while in *Kshaya* of *Rakta Dhatu* in the body results in *Twakaparushyam* (rough skin). The presence of *Shudh Shukra* in the body is also reflected by the lusture of the *Twacha*. While describing the *Ashtasaarpurush*, Acharya Charak considered *Twaksaarpurush* instead of *Rasasaarpurush*.

Role of Mala

Prakrit Karma	Kshaya	Vrddhi
Maintaining the moisture content, tonicity and elasticity	Dryness and cracks in the skin.	Pruritus

of the skin.		
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Role of Twacha in Rogamarga

Acharya Charaka describes Bahya, Madhya, Abhyantara as three Rogmargas. Twacha is included in Bahya Rogmarga as it is outermost layer and first line of defense and every element in external environment will come in contact with Twacha first.

Role of Twacha in Gyanendriya

Twacha is the Adhishthana of Sparshanendriya as it carries the sensation of touch because of Vayu Mahabhuta. It covers the external part of body including the sense organs.

Twacha Stara (Skin layers)

In Ayurveda Samhita several layers of Twacha has been described on the basis of different names, associated skin disorders observed in Twacha Stara (Skin Layers) their variable thickness and functions performed by these layers. These skin layers are described from superficial to deep. Its thickness is measured on the parameter available in that era i.e. "Vrihi" that can be taken as thickness and size of paddy or barley. There is different opinion about numbers of skin layers Twacha Stara is observed among Atreya and Dhanwantri denomination. This controversial opinion about number of skin layers is due to prospective vision of surgeon and physician.

Name of samhita	Twacha Stara
Sushruth Samhita, Astanga Hridaya, Bhavprakash samhita and Sharangdhar samhita	seven layers of Twacha Stara
Charaka samhita, Bhel samhita & Astanga Sangrah	six layers of Twacha Stara

Comparison of Tawcha Stara by various Acharyas

First layer

Name of Twacha Stara	Name of Acharya	Roga Adhishthana/Karma
Avabhasini	Sushruta	Sidhma and Padamkantka

Avabhasin	Dalhan	Exhibition of Gaur, Shyamadi Varan (complexion) and five types of Prabha (glory) and Chaya (shades) of the body with help of Bhrajak Agni present in this layer
Udakdhara	Charak & Vriddha Vagbhat	holds the Udakdhatu
Udakdhara	Indu	Carries Udaka Dhatu and prevents outflow and maintain 'Aradrata Bhava'
Bhasini	Laghu Vagbhat	Holds the Udakdhatu
Avabhasin	Ghanekar	Exhibition of complexion, glory and different shades of Twacha

Second layer

Name of Twacha Stara	Name of Acharya	Roga Adhishthana/Karma
Lohita	Sushruta	Tilkalka, Nyacha & Vyanga
Asrugadhara	Charak & Vriddha Vagbhat	which carries Rakta
Rudhantva Asram	Indu	It holds the blood and prevents outflow of Rakta dhatu from the body
Lohini	Hemadri	
Avabhasini	Ghanekar	

Third layer

Name of Twacha Stara	Name of Acharya	Roga Adhishthana/Karma
Shweta	Sushruta	Of Charmadal, Ajagalika & Mashak
Tritiya twacha	Charak & Vriddha Vagbhata	Sidhma & Kilasa

Tritiya twacha	Astanga Hridya	Sidhma, Shivtra
Shewta	Ghanekar	

Fourth layer

Name of Twacha Stara	Name of Acharya	Roga Adhithana/Karma
Tamra	Sushruta	Kustha and Kilasa
Chaturthi twacha	Charak	Dadru and Kustha
Chaturthi twacha	Astang Sangrah and Hridya	Sarva Kustha
Tamra	Sharangdhara and Bhavprakasha	Kilas and Shivtra
Tamra	Ghanekar	Production of melanin

Fifth layer

Name of Twacha Stara	Name of Acharya	Roga Adhithana/Karma
Vedini	Sushruth	Kustha and Visarpa
Panchami twacha	Charak & Vagbhat	Alaji & Vidradhi
Tvagavedini/Rogkarini	Hemadri	
Vedini	Sharangdhar and Bhavprakash	Sarvakustha & Visarpa
Vedini	Ghanekar	Perception of sensation

Sixth layer

Name of Twacha Stara	Name of Acharya	Roga Adhithana/Karma
Rohini	Sushruta	Granthi, Apachi, Galganda, Arbuda, & Shleepada
Shashthi twacha	Charak & Chakrapani	Arunshi and Tama Pravesha
Pranadhara	Vagbhat	Prana-dharan

Shashthi twacha	Indu	Tama Pravesha and Arunshi
Rohini	Ghanekar	Formation of granulation tissue and helps in wound healing

Seventh layer

Name of Twacha Stara	Name of Acharya	Roga Adhithana/Karma
Mansadhara	Shaushruta	Bhagandara, Vidradhi & Arsha
Sthula	Sharangdhara and Bhavprakash	Vidradhi
Sthula	Adhamal	Vidradhi, Bhagandara and Arsha
Sthula	Gannath Sen	Snehaadi Karshnam

According to Modern

When life induced by union of Sperm (*Shukra*) and ovum (*Shonita*) in uterus (*Garbhashaya*) it undergoes rapid transformation and formation and seven layers of skin form during embryonic period in third and fifth month of fetal age. Modern health science skin is derived from three diverse components: The dermis on the dorsal aspect of head, and trunk arises from dermatomes. The dermis of limb and lateral and ventral aspect of trunk arises from lateral plate of mesoderm. The dermis over most of head and over anterior aspect of neck is derived from neural crest. It is the largest organ of body. It is uniformly thick; at some places it is thick and thin at some place. Average thickness is about 1 to 2 mm.

Definition

The skin is a vital organ that covers the entire outside of the body, forming a protective barrier against pathogens and injuries from the environment. The skin is the body's largest organ; covering the entire outside of the body.

Types

The epidermis, the outermost layer of skin, provides a waterproof barrier and creates our skin tone. The Epidermis is further grouped into five layers;

1. Stratum Corneum or Horny Layer
2. Stratum Lucidum
3. Stratum Granulosum
4. Stratum Spinosum or Malpighian Layer
5. Stratum Basale or Germinative Layer

The dermis, beneath the epidermis, contains tough connective tissue, hair follicles, and sweat glands. The Dermis is further divided into two regions:-

- Papillary region
- Reticular region

The deeper subcutaneous tissue (hypodermis) is made of fat and connective tissue.

Ayurveda	Modern
Avabhasini	Stratum corneum
Lohita	Stratum Lucidum
Shveta	Stratum Granulosum
Tamra	Malpighian Layer
Vedini	Papillary Layer
Rohini	Reticular Layer
Mamsadhara	Subcutaneous tissue

Functions

1. Thermoregulation
2. Blood Reservoir
3. Protection
4. Cutaneous sensations
5. Excretion and absorption
6. Synthesis of Vitamin D

DISCUSSION

Classical texts and modern texts have different opinion about skin. But they both describe the layers, pigments, and thickness of skin. Moreover classical text describes the diseases which occurred in

particular layer of skin. After detailed study of various concepts about *Twacha Sharir* from various *Ayurvedic* literatures and modern science. We can state that *Twacha* is well established tool in clinical examination, diagnostic & prognostic aspect in medical science. This study is an effort to bring autocracy about various doubtful concept of *Twacha Stara*, which may be useful for scholars, teachers & physicians for the purpose of people's interest.

CONCLUSION

This detailed study of *Twacha Shareer* in both *Ayurvedic* and Modern sciences provided well established concept of *Twacha* (skin) in medical science. 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. Skin is most presentable part of body having definite role in personality. Hence to know abnormalities of skin one must have knowledge about normal state of its structure and function of skin must to be studied in detail. In above literary research structural and functional aspects of skin according to modern and classical text were studied. 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.

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