



## REVIEW ARTICLE

### DOSHIC PHYSIOLOGY OF SKIN

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#### Abstract :

The balance of dosha represents the healthy state and imbalance will cause various diseases. In normalcy doshas will be performing their own functions and individual doshas will be having their own specific sites. By telling the various sthana of each dosha, different function that is taken up by individual dosha in different sites has been highlighted.

By mentioning 'sparshanendriyam' as one of the sthana of vata dosha the sensory functions of skin to vata dosha has been emphasised. By mentioning 'sparshanam' as one of the sthana of pitta dosha, the function of colouring/pigmentation of skin, which is majorly carried out by melanocytes by secreting melanin pigment has been highlighted. Meda is one among the sthanas of kapha dosha; this can be considered as the adipose tissue of skin/below skin. Since sweda is mala of meda it can be also considered as the secretions from the eccrine glands.

With respect to skin, sensory functions, both tactile and thermal is carried out by vata dosha more specifically vyana vata, pigmentation to the skin carried out by melanocytes by secreting melanin, it is nothing but function of pitta dosha more specifically brajaka pitta with the help of udana vata and finally production of sweat in sweat glands is the function of kapha. So there is the need for further study and research regarding the sthanas of all three doshas in different structures/organs in the body and its physiology.

Keywords : Doshic Physiology, Skin

#### Introduction:

Dosha, dhatu, mala together form the basis of the body.<sup>1</sup> The balance of these entities represents the healthy state and imbalance will cause various diseases.<sup>2</sup> In normalcy, dosha will be performing their own functions in their own specific sites. By mentioning the various sthanas of the each dosha the different function performed by individual doshas in different sites has been emphasised. The sub-types of dosha, its location and function have also been mentioned.<sup>3</sup>

Regarding the sthana of various dosha authors have different opinion. Later authors have added some more sthanas of doshas. For example, ears among the location of vata;

umbilicus, eyes and skin among the location of pitta; kloma, nose, tongue among the location of kapha.<sup>4</sup> In the verses related to the sthana of dosha, in all the 3 verses skin or the structure related to skin as the sthana of one or other dosha.

A brief physiological anatomy of twak (skin) is necessary to know the doshic physiology of twak. Twak is formed as the cream from the milk and it is having 7 layers namely avabhasini- which reflects and shines the colour; lohita, shweta, tamra – named after the appearance/colour; vedini-which is responsible for vedana gnyana; rohini-from where the roma kupa takes origin; mamsadhara-in relation/close

contact with mamsa. The thickness of the layers of twak as mentioned are usually related to the skin over the muscular parts of the body, but not the skin over the forehead or over the small fingers. In abdomen, incision is indicated as thick of thumb width; this denotes the more thickness of skin of abdomen.<sup>5</sup> The knowledge of this anatomical variation is very essential before surgery. Other opinion is twak is having six layers namely udakadhara, asrakdhara, sidmakilasa adisthana, dadrukusta adisthana, alajividradi adisthana, arumshi adisthana layer.<sup>6</sup> Apart from all this twak is having relationship with dhatu and mala. For e.g. in case of rasa and rakta ksaya, the important manifestation is rouksyata, which is seen in twak. In case of rakta dusti, almost all manifestations are seen in the twak. Twak is mula of Mamsavaha srotas and romakupya is mula of swedavaha srotas, which originates from rohini layer of twak.<sup>7</sup>

At the elemental level, all the mahabuta are present in twak. Akasa mahabuta in the form of sweat pores, vayu is the mula for sparshana i.e. tactile sensation, agni mahabuta is in the form of brajaka pitta, jala mahabuta in the form of sweda (sweat) and other sebaceous secretions, prithvi mahabuta is the one which gives form, shape or structural appearance.

Knowledge of modern functional anatomy of skin will be helpful for a better and clear understanding of doshic karmas related to twak. Skin, the largest organ in the human body is the general covering of the entire external surface of the body including the external auditory meatus and the outer surface of the tympanic membrane.<sup>8</sup> Skin consists of two layers, the superficial layer called the epidermis. It is made up of superficial cornified zone and deep germinative zone. In deep zone there are melanocytes. The second layer is dermis/corium, which consists of superficial papillary layer and deep reticular layer.<sup>9</sup> The major function of the skin are protection, sensation, regulation of body temperature, absorption, secretion, excretion, regulation of pH, synthesis of vitamin D, storage of chlorides, repairing the cuts and wounds of skin.<sup>10</sup>

Sweat glands are situated in the dermis, surrounded by a network of capillaries. Water and metabolites of the blood of these capillaries are eliminated by these sweat glands. The three important functions of sweat are maintenance of texture, smoothness and lustre of skin, maintenance of water balance and maintenance of body temperature.<sup>11</sup>

Pigmentation of skin is determined by at least five pigments present at different levels and places of the skin. These are: melanin, melanoid, carotene, hemoglobin, oxyhemoglobin. The amount of first three pigments varies with the race, age and part of the body. The colour is red where the keratin is thin (lips) and it is white where keratin is thick (palms and soles).<sup>12</sup>

It is necessary to know the normal physiological functions taken up by the dosha in twak and how to establish the particular physiological function to particular dosha with the help of modern anatomy, physiology and pathological conditions told in ayurvedic classics.

### **Physiology of Vata in Skin**

While mentioning the sthana of different dosha, functions of the dosha have been indirectly emphasised with respect to skin. 'sparshanendriyam' is one among the sthana of vata.<sup>13</sup> The above mentioned word emphasises on the cutaneous sensations which are carried out by various nerve endings and corpuscles. E.g., touch sensation by Meisner's corpuscles, temperature variations by Krause end bulb, pain sensation by free nerve endings and pressure sensation by Pacinian Corpuscles/Golgi Mazzoni body. From these sensory receptors, the somatic sensory pathway will carry the impulses to the somato sensory area in the cerebral cortex and the cerebellum. The pathway consists of first order neuron which carries impulses from somatic receptors to brain stem or spinal cord; the second order neuron will conduct impulses from brain and spinal cord to the thalamus; the third order neuron will conduct impulses from thalamus to the primary somatosensory area of the cortex on the same side and hence sensation is perceived. In this context, considering one of the lakshana of vata kshaya i.e.

mudasangnyata/alpasangnyata which may be related to the altered/decreased tactile sensation with respect to skin. By this we can say that vata dosha is responsible for tactile sensation, especially the vyana vata which is present throughout the body and is responsible for all physiological functions in the body. So, by mentioning 'sparshanendriyam' as one of the sthana of vata dosha the sensory functions of skin has been allotted to vata dosha.

### Physiology of Pitta in Skin

Among the list of various sthana of pitta, the word 'sparshanam' has been mentioned in relation to skin.<sup>14</sup> By this, the skin colour and the entities responsible for the pigmentation have been emphasised. E.g., melanin, melanoid, carotene etc. The melanocytes present in the germinal layer of epidermis are the cells which synthesise Melanin. The amount of melanin causes the skin's colour to vary from pale yellow to black. The number of melanocytes is almost same in all people, difference in skin colour is mainly due to the amount of pigment produced by melanocytes and transfer to keratinocytes. Considering one of the lakshana of pitta kshaya lakshana, nishprabatha/prabha hani, which indicates the presence of pitta in skin and physiological function of pitta in twak is colouring/pigmentation, which is carried out by brajaka pitta. So, by mentioning 'sparshanam' as one of the sthana of pitta dosha the function of colouring/pigmentation of skin has been totally covered. For every function vata dosha is necessary, for pigmentation udana vata is necessary which can be understood by mentioning the word 'varna' in the verse related to function of udana vata

### Physiology of Kapha in Skin

Meda is considered as one among the different sthana of kapha dosha.<sup>15</sup> In the concept of ashraya-ashrayee bhava, meda is considered as the ashraya for kapha. In relation to skin, it can be considered as the adipose tissue of skin/below skin. Since sweda is mala of meda it can be also considered as the secretions from the eccrine glands. This can be proved by taking the example of kapha kshaya lakshana in which

roukshyata is one of the feature which means there is absence/decrease of jala mahabuta and in skin it is nothing but the secretions of eccrine glands. Eccrine glands secrete sweat when the external temperature is more and evaporation of sweat will help in lowering the body temperature. Secretion of sweat helps in regulation of body temperature and water balance, which exactly matches with function of sweda i.e. 'kleda vidhriti'.<sup>[16]</sup> Considering among the types of kapha dosha, tarpaka kapha is the one which is present in all the indriya and nourishes them.

### Vatadosha and Swedapravritti

The secretion from eccrine glands is controlled by cholinergic sympathetic nerves. When there is stimulus to these nerves there is contraction of eccrine glands which pushes the secretion (sweat) outside. This matches with the 'kseptha bahir malanam' function of vata<sup>17</sup> and this function is attributed to the cholinergic sympathetic nerves.

### Conclusion

The Dosha are present throughout the body and in normalcy they perform their normal physiological function. With respect to skin the neurological functions like sensory functions (tactile and thermal) and function of excretion of sweat from sweat glands are done by vata dosha, specifically vyana vata.

Pigmentation of the skin by melanocytes through secretion of melanin is nothing but function of pitta dosha, specifically brajaka pitta with the help of udana vata.

Production of sweat in sweat glands is the function of kapha. Tarpaka kapha is responsible for the nourishment of all the five indriyas including twak.

So all the three dosha are present in the skin and perform the various physiological functions. There is the need for further study and research regarding the sthana of all three dosha in different structures/organs in the body and its physiology.

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