

## Review Articles

Prevalence of Touch Sensation (*Sparshanendriya-Vyapaktva*)

Ajay Kumar\*, Tina Singhal\*\*, B. N. Upadhyay\*\*\*

Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

## Abstract

There are much more topics in our *Ayurvedic* classics about which we have limited knowledge. Like this an another topic is *Indriya*. We don't know what is *indriya* or what are their sites. Are the organs by which we perceive sensation called *Indriya* or different from them? *Acharya Charaka* has told five types of *Indriyas*, *Sparshanendriya*, *Chakshurendriya*, *Ghranendriya*, *Rasanendriya* & *Shravanendriya*. He also described their sites, functions, composition, and their properties. But he also told that *Sparshanendriya* is the main *Indriya* and it is present in all *Indriyas*. Why *Charaka* told that *Sparshanendriya* is *Vyapak* in all *Indriyas*. Is this concept wrong or right? The answer is right & this concept can be proved by following means as described in this paper.

**Key words:** *Vyapaktva*, *Sparshanendriya*, Touch, *Charaka*.

## Introduction

*Indriyas* are the organ of sensation. According to *Charaka* *indriyas* are formed from *panchamahabhutas*<sup>1</sup> & according to *Sushruta* these are originated from *ahamkâr*. When *indriya*, *mana* and *indriyarth* communicate with each other they cause acquaintance of knowledge<sup>2</sup>. Generally *indriyas* are of two types -

1. *Gyanendriya*: Involved in the acquaintance of knowledge.
2. *Karmendriya*: Involve in daily routine work.

Further *Gyanendriya* are of five types<sup>3</sup>:

1. *Sparshanendriya*
2. *Rasanendriya*
3. *Ghranendriya*
4. *Chakshurendriya*
5. *Shrotrendriya*.

The site of *Sparshanendriya* is the skin. Although *Sparshanendriya* is *Panchabhautik*, yet there is predominance of *Vata* in *Sparshanendriya*. According to *Charaka*, among all *Indriya*, *Sparshanendriya* is the main and present in all *indriyas*. There are various references present in texts showing the *Vyapaktva* of *Sparshanendriya* in all *Indriyas*<sup>4</sup>.

\*M.D. (Ayu.), Dept. of Kayachikitsa.

Email: ajay.ayurveda@yahoo.co.in

\*\*M.D. (Ayu.), Dept. of Rachna Sharir.

\*\*\*Professor & Head, Dept. of Kayachikitsa.

DOI: 10.4103/0974-8520.68189

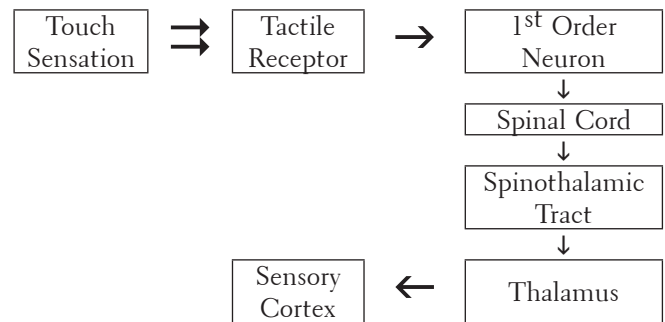
तत्रैक स्पर्शनिद्रियम् इन्द्रियाणामिन्द्रियव्यापकं ।।  
सर्वेन्द्रियाणां व्यापकस्पर्शकृतो ।।  
सर्वत्रानुगतं देहं शुक्रं संस्पर्शनि ।।

च. सू. ११/३८

च. सू. ११/२८

च. सू. २/४४६

This concept of *Charaka* is very true and scientific. In fact, all *indriyas* communicate with their own *indriyarth* via touch. In absence of contact or touch with own *indriyarth*, no any *indriya* could do their normal functions. In this paper it has been tried to explain this concept on modern criteria.

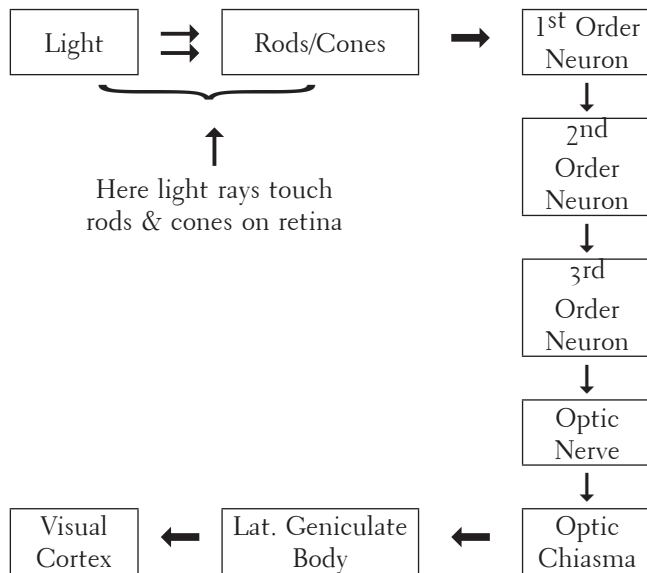
1. Touch Sensation (*Sparshanendriya*)

Skin is considered as the largest sense organ in the body. It has many nerve endings which are specialized to form cutaneous receptor<sup>5</sup>. The dermis of the skin and the subcutaneous tissue contain receptors for the sensations of touch, pressure, heat, cold, and pain. The receptors for pain, heat, and cold are free nerve endings, which also respond to any intense stimulus, intense pressure, for example, may be felt as pain. The receptors for touch and pressure are encapsulated nerve endings, meaning that there is a cellular structure around the nerve

ending. These receptors are stimulated by sensation of touch, pain, pressure and temperature and convey these sensations through the afferent nerve to brain<sup>6</sup>. At various levels of impulse conduction one nerve touches to other and transmit its message.

## 2. Visual Sensation (*Chakshurendriya*)

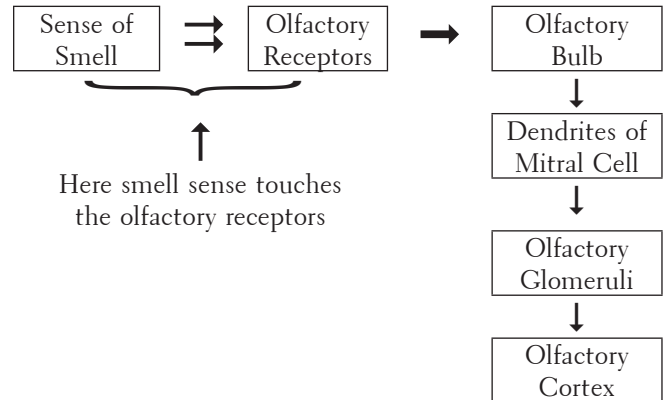
The eye contains the receptors for vision and a refracting system that focuses light rays on the receptors in the retina. When the light rays fall on and touch the visual receptors (rods & cones) various changes occur in this receptor resulting in viewing of an object. When light rays strike the retina, they stimulate chemical reactions in the rods and cones. In rods, the chemical rhodopsin breaks down to form scotopsin and retinal (a derivative of vitamin A). This chemical reaction generates an electrical impulse, and rhodopsin is then resynthesized. The impulses from the rods and cones are transmitted to ganglion neurons ; these converge at the optic disc and become the optic nerve, which passes posteriorly through the wall of the eyeball<sup>7</sup>. Here light rays touch the receptors and then a series of events occur. If this contact will not happen then vision could not be possible. So touch is necessary for the complete pathway of visual sensation.



## 3. Sensation of Smell (*Ghranendriya*)

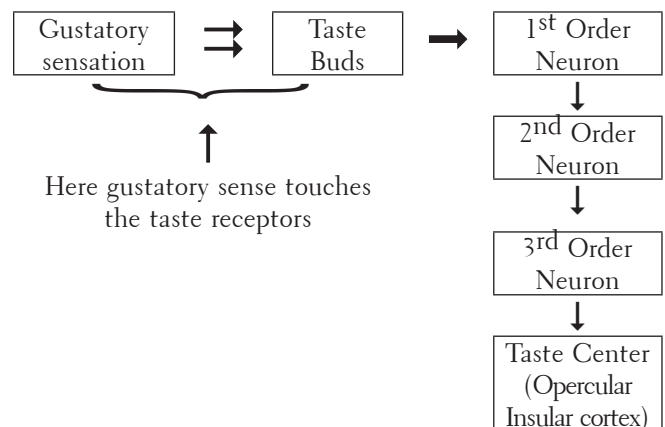
The receptor cells for the smell sensation are the olfactory cells, which are actually bipolar nerve cells derived originally from the central nervous system itself<sup>3</sup>. The olfactory receptors are chemoreceptors that detect vaporized chemicals that have been sniffed into the upper nasal cavities. Just as there are specific taste receptors, there are also specific scent receptors, and research indicates that humans have several hundred different receptors<sup>8</sup>. When stimulated by vapor molecules, The molecules get dissolved in the mucus and it comes in contact with intra-membranous particle contained within the cilia of the receptor cells and combine with

these particles & then olfactory receptors generate impulses carried by the olfactory nerves (1<sup>st</sup> cranial) through the ethmoid bone to the olfactory bulbs<sup>9</sup>. The pathway for these impulses ends in the olfactory areas of the temporal lobes of brain causing perception of smell.



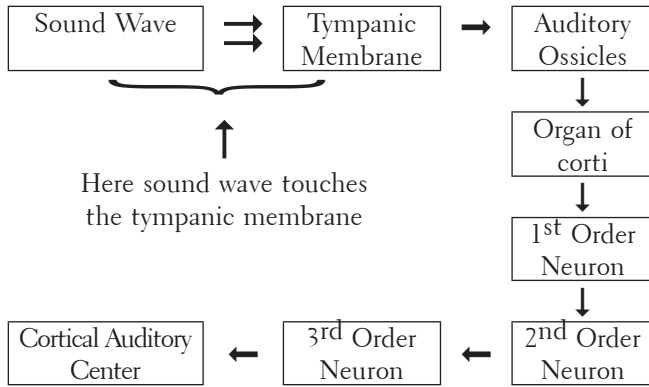
## 4. Taste Sensation (*Rasanendriya*)

Taste is mainly a function of the taste buds in the mouth, but it is common experience that one's sense of smell also contributes strongly to taste perception. In addition, the texture of food, as detected by tactual senses of the mouth, and the presence of substances in the food that stimulate pain endings, such as pepper, greatly alter the taste experience<sup>10</sup>. The taste receptors are found in taste buds, most of which are in papillae on the tongue. These are chemoreceptors which are stimulated by substances dissolved in mouth by saliva. The chemicals are foods and the solvent is saliva (if the mouth is very dry, taste is very indistinct). The dissolved substances acts on microvillus of taste receptor exposed in the taste pore. This causes development of receptor potential in receptor cells. This in turn is responsible for the generation of an impulse going to appropriate part of brain resulting in sensation of taste. The impulses from taste buds are transmitted by the facial and glossopharyngeal (7<sup>th</sup> and 9<sup>th</sup> cranial) nerves to the taste areas in the parietal-temporal cortex<sup>11</sup>. In the whole pathway of taste sensation, touch is required at different levels of nerve conduction. If touch not takes place at any level then we could not perceive taste.



## 5. Hearing Sensation (*Shravenendriya*)

The process of hearing involves the transmission of vibrations and the generation of nerve impulses. When sound waves enter the ear canal, vibrations are transmitted by the following sequence of structures: eardrum, malleus, incus, stapes, oval window of the inner ear, and perilymph and endolymph within the cochlea. The sound waves which are transmitted by the tympanic membrane, malleus and incus cause the movement of stapes. This leads to the origin of vibrations in the fluid of cochlea. The vibrations now stimulate the hair cells in organ of Corti. The basilar membrane ripples and pushes the hair cells of the organ of Corti against the tectorial membrane. When the hair cells bend, they generate impulses that are carried by the 8th cranial nerve to the brain<sup>12</sup>. This in turn causes generation of action potential in auditory nerve fibers. When the auditory impulse reaches the cerebral cortex the perception of hearing occurs.



## Discussion

‘*Shravenendriyanam vyapaka Sparshakrito*’<sup>13</sup> this quotation of *Charaka* is very scientific & this shows that our Acharyas have high level of scientific

thinking. In present era, we really not try to understand the main theme of our classical texts but only think its superficial aspects & tell that old texts are unscientific. In above lines it has been tried to explain this small quotation on modern backgrounds & it proves that *sparshanendriya* is present in all *indriyas*.

## Conclusion

Even though there are five sense organs with the corresponding five objects of theirs, but as matter of fact there is only one sense faculty which pervades all the sense organs. No sensation can occur without a sense of touch. So it is the tactile sensation which predominates all the sensation<sup>14</sup>.

## References

1. Shastri K N & Chaturvedi G N, 1984, Charak Samhita with Vidyotini Hindi Commentary, Chaukhambha Bharti Academy, Varanasi, 12<sup>th</sup> ed, Chapter 8, Shloka 8, p. 176.
2. Ibid. Chapter 8, Shloka 7, p. 176.
3. Ibid. Chapter 28, Shloka 31, p. 782.
4. Ibid. Chapter 11, Shloka 38, p. 230.
5. Sembulingam K, 2001, Essential of Medical Physiology, Jaypee Brothers Medical Publication, New Delhi, India, 2<sup>nd</sup> ed, Chapter 61, p. 259.
6. Chaudhari S K, 2001, Concise medical Physiology, New Central Book Agency Pvt. Ltd., Calcutta, India, 3<sup>rd</sup> ed, Chapter VIII. 6, p. 384.
7. Arthur C. Guyton, John E. Hall, 2006, Textbook of medical physiology, Elsevier Inc, Philadelphia, Pennsylvania, 11<sup>th</sup> ed, Chapter 50, p. 628.
8. Ibid. (6), Chapter XB 2.5, p. 477.
9. Ibid. (5), Chapter 177, p. 807.
10. Ibid. (7), Chapter 53, p. 663.
11. Ibid. (6), Chapter XB 2.5, p. 481.
12. Ibid. (7), Chapter 52, p. 657.
13. Ibid. (1), Chapter 11, Shloka 38, p. 230.
14. Sharma R K and Dash B, 2007, Charak Samhita, Chaukhambha Sanskrit Series Office, Varanasi, Vol. 1, Chapter 11, Shloka 38, p. 223.

## हिन्दी सारांश

### स्पर्शनेन्द्रिय व्यापकत्व

अजय कुमार, टीना सिंघल एवं बी.एन. उपाध्याय

प्राचीन आयुर्वेद ग्रंथों में बहुत से ऐसे तथ्य हैं जिनकी व्याख्या आज तक नहीं हो पायी है या हम समझ नहीं पाये हैं। ऐसा ही एक विषय है इन्द्रियाँ। इन्द्रियों से ही विषयों का ज्ञान होता है पर इन्द्रियाँ क्या हैं? इनका स्वरूप क्या है? इनका स्थान क्या है? हम आज तक नहीं जानते हैं। आचार्य चरक ने ५ इन्द्रियाँ बताई हैं। स्पर्शनेन्द्रिय, चक्षुर्इन्द्रिय, घ्राणेन्द्रिय, रसनेन्द्रिय एवं श्रवणेन्द्रिय। इनमें से स्पर्शनेन्द्रिय को आचार्य चरक ने सर्वव्यापक कहा है। स्पर्शनेन्द्रिय को सर्वव्यापक कहने का कारण क्या है? क्या यह आचार्य चरक का केवल कल्पना मात्र है या वास्तविकता है? प्रस्तुत लेख में इन सभी तथ्यों की विस्तारपूर्वक व्याख्या की गई है।

“सर्वेन्द्रियाणां व्यापकस्पर्शकृतौ यों ..... ॥” (च. सू. ११/३८)