

## A CRITICAL REVIEW ON MODE OF ACTION OF *NASYA KARMA* IN *URDHVAJATRUGATA ROGAS*

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### ABSTRACT

*Panchakarma* is considered to be one of the most eminent branch of Ayurveda which incorporates *vaman*, *virechana*, *basti*, *nasya* and *raktamokshana*. *Panchakarma* treatment has protective and curative methodology towards various diseases. *Nasya* (nasal drug delivery) is one of the treatment among *Panchakarma* in which medication is instilled through nasal pathway. *Nasya* is a highly selective and acclaimed method of drug administration used in Ayurveda since ages for various systemic diseases mainly for *Urdhvajatrugata Rogas* i.e. diseases of organs above clavicle (head and neck region). For being one important component of five bio purificatory procedural practices

of Ayurveda (*panchakarma*) and for its special ability to deliver the drugs directly to the brain while by- passing the blood brain barrier, It is one of the highly practiced and beneficial therapeutic process seen in concurrent Ayurvedic clinical settings. The equivalent for *nasya karma* are *shirovirechana* and *murdha virechana*. *Virechana* word indicates corrective property that is the reason *shirovirechana* word is given for *nasya karma*. *Nasya* might be utilized in different conditions where medication isn't consumed orally and when there is prerequisite of long haul treatment its utilization is advantageous. The channels conveying responses in the human body are straight forwardly associated with *shira* (head), like the sunrays are associated with the sun. Since nasal mucosa is principally of lipophilic and furthermore have some hydrophilic nature, by expanding lipophilicity of medicine drug absorption by this route can be boosted. That is the reason sneha processed with various medications as per vitiated *doshas*. *Nasya* can be utilized in various problems of

supraclavicular area like nasal disorders *shiro rogas* like *Ardhawabhedaka*, *Anantvat*, *Suryavart*, *Mukhashosha* (dryness of mouth), *Ardita* (facial palsy) and different disorders of mouth due to vata and pitta. In this article we will discuss on mode of action of *nasya karma* and its indication in various disorders.

**KEYWORDS:** *Nasya karma*, *Ardhawabhedaka*, *Urdhvajatrugata Rogas*, *Panchakarma*.

## INTRODUCTION

*Nasya* (nasal drug delivery) is a highly selective and acclaimed method of drug administration in which drug is administered through nasal route (Su. Chi. 40/21). *Nasya* used in Ayurveda since ages for various systemic diseases mainly to uproot the deep seated *Urdhvajatrugata Rogas* i.e. diseases of organs above clavicle (head and neck region). *Nasya karma* is indicated *Shira*. *Nasya* is utilized in different diseases especially for that of *Shiroroga*. It has its mention in almost all the Ayurveda classics. For being one important component of five bio purificatory procedural practices of Ayurveda (*panchakarma*) and for its special ability to deliver the drugs directly to the brain while by-passing the blood brain barrier,<sup>[1]</sup> It is one of the highly practiced and beneficial therapeutic process seen in concurrent Ayurvedic clinical settings.<sup>[2]</sup>

In this method medication can be utilized as *churna*, juice, decoction, *sneha*, processed milk, *ghrita* and fumes. In Ayurveda, *shira* is considered as *uttamanga* and seat of *prana*. The condition of harmony of the body relies on the *shira* is compared with roots of a tree. According to Acharya Vagbhat- '*Nasa hi shiraso dwaram*' (A.H.Su. 20/1) i.e. nose is the gateway of head. The medication which is instilled into the nostril climbs upto the *sringataka marma* and spreads interior of the head. The olfactory nerves of the nose are associated with the higher centers of cerebrum. *Panchakarma* plays a critical role in the management of stubborn and the chronic diseases. It Express or destroys the *doshas* from grass root level. So disease does not reoccur. Ayurveda has *nasya* therapy as master key for *shiroroga*. It helps in regenerating the body and mind and in turn alleviates pain and stress.

## Etymological Derivation of Nasya

The derivation of the word *Nasya* is from '*Nasa*' *dhatu*, which means, *gati*-motion. *Vyapti* bears the meaning pervasion. Here the *Nasa dhatu* is inferred in sense of nose. According to Vachaspatyam word '*Nasta*' means beneficial for nose.

**Definition of Nasya<sup>[3]</sup>**

"औषधमौषधसिद्धो वा स्नेहो नासिकाभ्यां दीयति इति नस्यम् ॥" (सु.चि.40/21)

*Nasya* is a therapeutic procedure in which drug or *sneha* processed with drug is administered through nose.

**Nasyakarma Paryaya<sup>[3]</sup>**

*Shirovirechana*, *Shirovireka*, *Murdhavirechana*, *Navana* and *Nastakarma* are the synonyms of *Nasya Karma*. Sushruta has specified the word *Shirovirechana* to describe a particular variety of *Nasyakarma*. The word *Virechana* means elimination of morbid *doshas* from the body. Thus *Shirovirechana* or *Murdhavirechana* indicates its main function of elimination of morbid *doshas* particularly from the *Shirah* or parts situated above the clavicle. Charaka has used the term "*Nastah Pracchardana*" for *Nasya*<sup>[4]</sup> which denotes *Shodhana* karma done by *Nasya*.

**Age at which nasya ought to be given-** Acharya Vagbhat-7-80 years, Acharya Sharangdhara-8-80 years.

**Time of Nasya as indicated according to ritu (Acharya Charaka)** - Generally *nasya* is given in pravrita, sharada and basant ritu yet in emergency or according to disease condition it can likewise be given in other seasons also. Moreover, in grisma ritu it ought to be given in poorvahn (promptly toward the beginning of the day), in shita ritu it ought to be given in madhyahn (mid early afternoon) and in varsha ritu when there are no mists in the sky.

**Classificatin of Nasya Karma****Table no. 1: Classificatin of Nasya Karma.**

S.N.	Name of Acharya	No	Reference	Classification
1.	Charaka	3	Ch.Si. 9/89,92	According to mode of action - Rechana, Tarpana, Shamana According to the method of administration-Navana, Avapidana, Dhmapana, Dhuma, Pratimarsha.
			Ch. Vi. 8/152	According to various parts of drugs utilized-Phala, Patra, Mula, Kanda, Pushpa, Nirayasa, Twak
2.	Sushruta	5	Su.Chi.40/21	Shirovirechana, Pradhmana, Avapida, Nasya, Pratimarsha
3.	Vagbhata	3	As.H.Su.20/2	Virechana, Brimhana, Shamana
4.	Kashyapa	2	Ka.Si. 2 & 4	Virechana, Karshana

5.	Sharangadhara	2	Sha.Utt.8/2,11,24	Rechana, Snehana
6.	Bhoja	2	Dalhana S.Chi.40/23	Prayogika, Snehika
7.	Videha	2	Dalhana S.Chi.40/44	Sangya Prabodhaka, Stambhan

According to Acharya Vagbhata dose of *snehana* is of two types:

- *Marsha*-6 drops (*hina bala*), 8drops (*madhyam bala*), 10 drops (*uttama bala*) in every nostril.
- *Pratimarsha*-1 or 2 drops (*Astanga Hridaya* and *Sharangdhara* - 2 drops in every nostril)

### Therapeutic Action of Nasya Karma

Ayurvedic classics have given a precise standard operative procedures (SOP) to be used in nasya i.e, indications, contraindications and pre and post procedural requisites to ensure its safe and effective use and to deliver the desirables. This is obvious that any ignorance to such details of the procedure may eventually lead to its erratic performance. Seeing the direct access of drugs given through nasal route to the brain tissue, this can be highly sensitive, warranting urgent actions. Nasal drug delivery in modern pharmacology is only a recent phenomenon. Researches done in past two decades have shown definitive advantages of nasal drug delivery over other routes.<sup>[5]</sup>

By passing first pass effects of liver and avoiding the degradation by gastrointestinal enzymes are the advantages making nasal route preferable for protein and peptide class of drugs. Common applications of a nasal route of drug delivery now a days are related to psychiatry, vaccines, and hormones. Nasal route is preferred over other conventional routes of drug administration where a quick action is desired through a small dose of drug and first pass metabolism of the drug is needed to be avoided.

### Anatomy of Nasal Cavity<sup>[6]</sup>

To understand the relevancy of the mode of action/mechanism of *Nasya*, a gross Understanding of the relative anatomy of the nasal cavity is very important. The nasal cavity is bounded by floor, roof, medial and lateral walls. Important anatomical structures for consideration are mainly the floor and the roof.

1. Floor is formed by the horizontal process of the Palatine bone.
2. Roof is very narrow and formed by:
  - Nasal and frontal bones, anteriorly
  - Cribriform plate of ethmoid bone in the middle, and
  - Body of sphenoid, posteriorly.

The roof of Nasal cavity is formed with the superior turbinate and cribriform plate. This is a specific plate which forms the floor of the anterior cranial fossa, having small pores in it. This is the specific area of olfaction formed by the superior turbinate constituted with special mucous membrane; which is called as olfactory membrane. This olfactory epithelium, where olfactory receptors are located, is also called as olfactory area. The total area of olfaction on each side is about 250mm.

The olfactory area (epithelium) is composed of mainly the following types of cells:

1. Supporting (Substantacular cells)
2. Receptor cells and,
3. Basal cells

Supporting cells are columnar cells which secrete mucous. The Receptor cells are those where one end forms into axon and the end facing mucous layer, forms into cilia which perceive the object (i.e., smell). These axons join together to form the olfactory tract and the olfactory bulb.

In Ayurvedic classics, applied aspects of *Nasa* have been specified for than their anatomical aspect (i.e., classics have given the importance of *jnanendria* (cognitive sense organs).<sup>[7]</sup> *Acharya Sushruta* (Ancient Ayurvedic scholar and author of text *Sushruta Samhita* while telling the importance of *Indriya pancha panchaka* (Sensory System), *Panchaabhibhuta Dhamanis* have been told, (i.e. the sense faculties perceive objects which are dominated by Particular Material Constituents). This phenomenon tells about *Gandha jnana* (the perception of smell), when *Gandha Artha* (object for smell) is perceived by *Nasa Indriya* (nose) through *Panchaabhibhuta dhamanis*. These *dhamanis* (neurons) are specific, referred to by the above scholar, which can be considered for olfactory receptors/neurons necessary for the smell. These *dhamanis* are porous structures, which perceive the objects.<sup>[8]</sup>

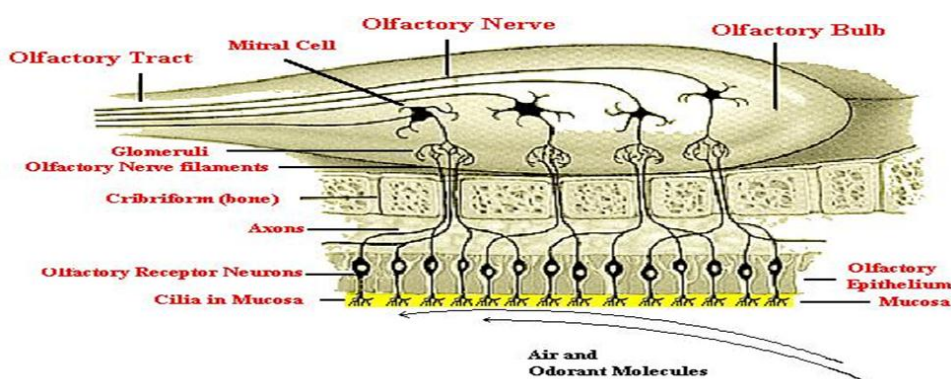
These can be considered for the ciliary bed/the transneural area of the Nasal mucosa where Absorption of the drug takes place. *Acharya Charaka* (Scholar) has mentioned one specific anatomical structure named *Munja*, which is like type of grass which acts like *Ishika* (i.e., like a painter's brush). This "painter's brush" when instilled in the paint, absorbs the paint; in the same way the *Munja* structure attracts the *doshas* when stimulated by the particular drug.<sup>[9]</sup> The *Munja* structure can be thought for an olfactory bulb and the *Ishika* for the numerous neurons join together to form the olfactory tract. These two scholars tried to

explain the functional aspects of anatomy of the nose, which simulates with the modern system.

It is stated in Ayurvedic classics that, there is a very close relationship between the *Nasa* and *Shiras* (Brain). Even modern science accepts this concept because the nasal mucosa is the only location in the body that provides a direct connection between central nervous system (CNS) and the atmosphere. Drugs administered to the nasal cavity rapidly traverse through the cribriform plate into the CNS by 3 routes.

1. Directly by olfactory neurons,
2. Through supporting cells and the surrounding capillary bed; and
3. Directly into the cerebrospinal fluid (CSF).

### Representation of olfactory system



### Pharmacodynamics of *Nasya Karma*

**Mucosal absorption of drug** Nasal cavity is associated with many distinct anatomico-physiological features, which form the basis of choosing it as a preferred route of drug delivery.<sup>[10]</sup> A human nose has two primary functions namely respiration and olfaction. There are anatomical distinctions in the distal 2/3 area of nasal mucosa which primarily acts as respiratory mucosa and proximal 1/3 which acts as olfactory mucosa. Respiratory mucosa has a rich blood supply aiming to conditioning of air as per the body temperature. This rich blood supply and microvillus surface of nonciliated columnar epithelium at the site makes it a preferred site for drug absorption. The respiratory mucosa is further lined with ciliated epithelium to adhere and propel the dust particles to nasopharynx subsequently. Olfactory mucosa of nasal cavity which makes the rear end of the nasal cavity is unique in the sense that it is connected to the external environment at one end and to the CNS on the other. It is obvious to note that the drugs applied on the respiratory mucosa of the nasal cavity have



much to do with their systemic absorption and draining in superior vena cava eventually having the opportunity to enter the systemic circulation instantly without facing a first pass metabolism.<sup>[11]</sup> Non-olfactory area includes the nasal vestibule which is covered with skin like stratified squamous epithelial cells and respiratory regions have atypical airways epithelium covered with numerous microvilli and forming large surface areas for drug absorption and transportation.

**Mechanism of nasal absorption-** The first step in absorption of drug is mucosal absorption. The main protein of mucous is mucin which has tendency to bind the different solutes. However there may be structural changes in the mucosal layer due to environmental changes. For this reason various mechanism of nasal absorption were established in which two mechanism have been mainly used, these are:<sup>[12]</sup>

1. **Paracellular mechanism-** The drugs applied on the respiratory mucosa choose a more selected para-cellular route of absorption It includes an aqueous route of transport but it is slow and passive. There is an inverse correlation between intra-nasal absorption and molecular weight of water soluble drug. The molecular weight of greater than 1000 daltons of drug show poor availability.
2. **Transcellular process-** the drugs applied on olfactory mucosa get absorbed through a transcellular route. It includes transport of drug through lipoidal route and it is a route for lipophilic drugs and it shows a rate of dependency on their lipophilicity.
3. **Carrier Mediated Active Transport** - Besides these two common mechanisms of drug absorption, a carrier mediated active transport has also been reported in nasal mucosa.<sup>[13]</sup>

Due to this reason *sneha nasya* has described as best between all types of *nasya* as olfactory mucosa shows the affinity towards lipophilic nature of *sneha nasya* and due to the lipophilic nature of *sneha* it get readily absorbed. The administered drug then shows its action by different ways like by passing into systemic circulation through vascular pathways or by stimulating the nerve endings in the mucosa. Thus after getting absorbed through mucosal layer it may take any pathways either vascular path or neural path to show its action.

#### **Factors Affecting Nasal Drug Absorption<sup>[14]</sup>**

**Position**— Head low position with slight elevation of the legs is the right position for *nasya karma*, it help in reaching the medicine deep inside olfactory mucosa and facilitates proper absorption of drug.

**Lipophilicity-** For the desired systemic effects, the drug should be hydrophilic and selectively applied on respiratory mucosa whereas for CNS effects the drug is required to be lipophilic and to be applied on olfactory mucosa.

**Viscosity** –Drugs having higher viscosity increases the absorption of drug by increasing contact time to mucosal layer. Hence, the absorption of *navan nasya* is enhanced by its viscous nature.

**Drug nature-** Chemical nature of drug, its molecular weight, particle size, solubility and dissolution rate may largely affect its absorption. Membrane permeability, rate of mucociliary clearance and environmental conditions also affect the drug absorption through nasal mucosa.

A drug-nasal mucosa interaction also plays a crucial role in determining the fate of the drug by promoting or retarding its clearance through the drug actions on the mucociliary layer. Some drugs have toxic effects on ciliated epithelium resulting in their delayed transit and enhanced absorption.<sup>[15]</sup> One most remarkable addition of Ayurveda to the nasal drug delivery science is the identification of polymorphic drugs where same formulations have different molecular characteristics and therefore have different usage. The drugs which are lipophilic and are intended to be used intra nasally should have small particle size and some water around it. This is characterized by *mridu paka* (mild cooking) for the drug intended to have a nasal application.

This is also noteworthy to see that Ayurveda proposes nasal drug instillation in various drug forms like powder (*pradhaman*) and aqueous extract (*avapeed*) besides recommending them in conventional oil or *ghrita* form.<sup>[16]</sup> Possible modes of adversity in *nasya*: An adversity in *nasya* may occur through multiple routes and mechanisms. In most *panchkarma* procedures, standard operative instructions are elaborately described and possible adversities in case of negligence have also been elucidated. Seeing the interconnection of the olfactory nerves to CNS and a possibility of drug reaching to the brain, aseptic precautions of the procedure and sterilization of the drug are of utmost importance. This is particularly important in case the drug is used in aqueous or powder form. There can be contaminants getting an access to the brain tissue through nasal route.<sup>[17]</sup>



Improper positioning of the patient while getting nasya may allow a drug to reach paranasal sinuses. If the drug is Irritant in nature, it may lead to discomfort as the paranasal sinuses are poorly ventilated. A contaminated drug may also set infections in such sinuses. Repeated spitting of the drug reaching at esophagus is one important mechanism to avoid the drug to reach GIT and to have their systemic effects after their re-absorption.

### **Importance of Post Nasya Massage**

Classical texts have recommended light massage on the frontal, temporal, maxillary, mastoid & on Many region. A comfortable massage on the above regions may help to subside the irritation of somatic construction due to heat stimulation. It may also help in removing the slush created in these regions.

### **CONCLUSION**

On the basis of the foregoing observations we can state that the procedures, postures & conducts explained for Nasya karma are of vital importance in drug absorption & transportation. The facts discussed here is also convincing us about the definite effect of Nasya karma in the disorders of central Nervous system, mental & some endocrinal disturbances also. The different medicine forms of *nasya* e.g. *kwatha*, *churna*, *milk*, *ghee*, *taila* *e.t.c.* acts through several mechanisms i.e. by vascular and neural pathway in the body. The mode of action of *nasya* therapy revealed by *different acharyas in ayurvedic texts* thousands of years ago can also be established in the present-day scenario with the help of contemporary scientific parameters. *Acharya Charak* mentioned that “*Dwaram hi shirso nasa*” and *shira* is considered as *uttamanga* hence any drug instilled into the nostril will have direct effect on the brain, due to this reason any disease related to supraclavicular region like migraine, facial palsy, paralysis, epilepsy, rhinitis etc. can be treated with *nasya* commendably. Nasal drug absorption depends not only on the physicochemical properties of the drug but also on physiological condition of the nose. *Ayurveda* have considered the various factors which affect the nasal drug absorption like dose, duration and time of administration and described the *nasya vidhi* for maximum absorption of nasal drug. Standardization of the *nasya karma* with *ayurvedic* and modern scientific parameters and validation of evidences with proper documentation is the need of the hour.

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