

NOSE-TO-BRAIN DRUG DELIVERY THROUGH NASYA KARMA IN PARKINSON'S DISEASE: AN AYURVEDIC-NEUROSCIENTIFIC CORRELATION

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ABSTRACT

Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by tremors, rigidity, bradykinesia, and postural instability, along with several non-motor symptoms that adversely affect quality of life. Although conventional treatments provide symptomatic relief, long-term therapy is often associated with complications and limited effectiveness in preventing disease progression. Therefore, alternative and integrative therapeutic approaches are being increasingly explored. The intranasal route of drug delivery has recently gained importance in neurological disorders due to its ability to transport drugs directly to the brain through olfactory and trigeminal pathways while bypassing the blood-brain barrier. Ayurveda describes a comparable concept through *Nasya Karma*. Classical Ayurvedic texts consider the nose as the gateway to the brain, highlighting the therapeutic relevance of

Nasya in neurological conditions. This article explores the correlation between modern nose-to-brain drug delivery mechanisms and the Ayurvedic concept of *Nasya Karma* in Parkinson's disease. Special emphasis is given to *Pratimarsha Nasya*, a gentle and safe form of *Nasya* suitable for long-term use in geriatric patients.

KEYWORDS: *Nasya Karma*, *Pratimarsha Nasya*.

INTRODUCTION

Parkinson's disease is recognized as the second most common neurodegenerative disorder after Alzheimer's disease. Owing to its progressive nature and increasing prevalence, there is a growing need to develop therapeutic strategies that are not only curative but also preventive. Parkinson's disease is a chronic neurodegenerative condition characterized by the gradual loss of dopamine-producing neurons.

Dopamine is a vital neurotransmitter responsible for the regulation and coordination of voluntary motor activity. Degeneration of these neurons leads to a deficiency of dopamine, which ultimately manifests as the clinical features of Parkinson's disease. The affected neurons are primarily located in the substantia nigra region of the brain. Clinically, Parkinson's disease is marked by cardinal motor symptoms such as tremors, bradykinesia, and muscular rigidity. In addition to these motor manifestations, patients frequently experience non-motor symptoms including anxiety, sleep disturbances, and depression, which significantly impact quality of life. Conventional management of Parkinson's disease primarily involves pharmacological agents such as levodopa in combination with carbidopa. Although these drugs remain the cornerstone of therapy, their prolonged use is frequently associated with complications including drug-induced dyskinesia and worsening tremors. Recent advancements in Parkinson's disease management have introduced surgical interventions such as Deep Brain Stimulation (DBS), which has shown beneficial outcomes in selected patients. From an Ayurvedic perspective, Parkinson's disease can be correlated with *Kampavata*, a condition described in classical texts. The Ayurvedic management of *Kampavata* includes the use of internal medications along with various Panchakarma therapies. Among these therapeutic procedures, *Nasya Karma* is considered particularly significant due to its direct action on disorders of the head and nervous system.

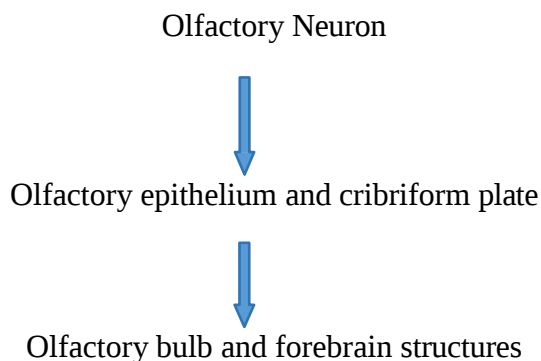
Mechanism of Action of Drug delivery through Nasal route

The intranasal route of drug delivery has gained considerable attention, particularly in the management of neurological disorders. This increased interest is attributed to the ability of intranasally administered drugs to directly access the central nervous system by passing the blood-brain barrier and bypassing hepatic first-pass metabolism. As a result, this route offers enhanced bioavailability, faster onset of action, and improved therapeutic efficacy compared to conventional systemic administration.

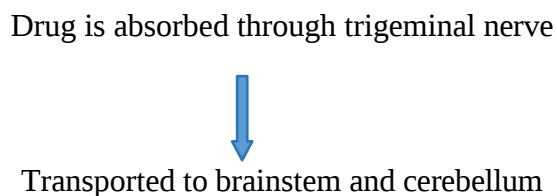
PATHWAY

Drugs administered via the intranasal route are transported to the brain through two principal pathways: The olfactory pathway and the Trigeminal pathway. Among these, the olfactory pathway is regarded as the most significant route,

1) Olfactory pathway



2) Trigeminal pathway



Drug absorption through Nasal Epithelium

Drug absorption across the nasal epithelium occurs through two primary mechanisms.

1. The first is transcellular transport, in which lipophilic drug molecules pass directly through the epithelial cells.
2. The second mechanism is paracellular transport, where drug molecules traverse the tight junctions present between adjacent epithelial cells.

MECHANISM OF ACTION

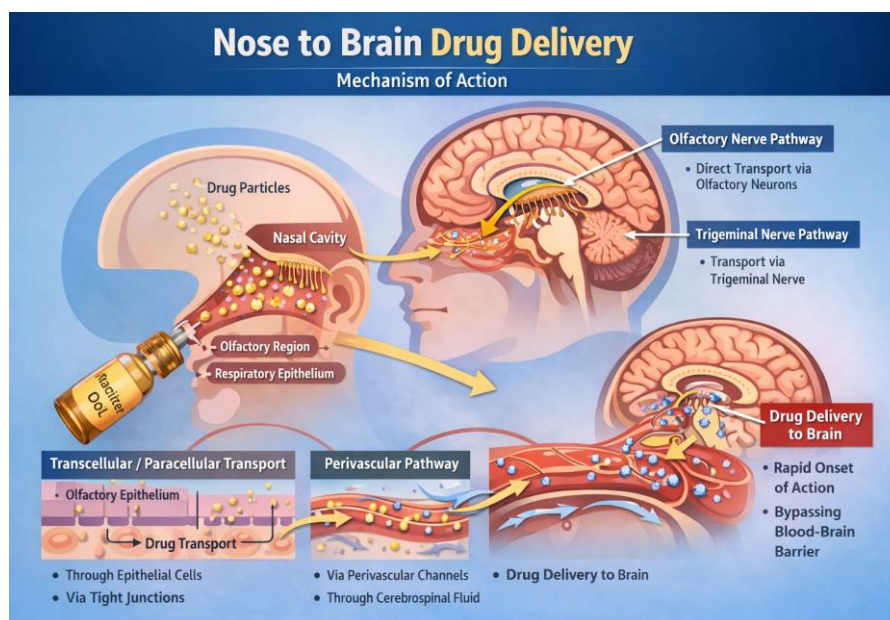


Figure 1.

Importance of Nasya

Classical Ayurvedic literature emphasizes the significance of the nasal route in the management of disorders related to the head and central nervous system. *Acharya Charaka* states “नासा हि शिरसो दवारम्,” which conveys that the nose serves as the gateway to the brain.

Types of Nasya

This statement implies that medicines administered through the nasal route can directly influence intracranial structures. Consequently, drugs delivered intranasally are believed to reach the brain and exert their therapeutic action effectively.

various types of *Nasya* has been described by Acharyas depending upon their technique of administration, their functions and their dosages.

Type of Nasya	Purpose / Action	Dosage (Matra)	Indications	Classical Reference
Virechana Nasya	<i>Shodhana</i> – expels aggravated <i>Kapha</i> from head region	8–10 drops per nostril (approx. 1 ml)	<i>Shiroroga</i> , heaviness in head, sinus congestion	<i>A.H. Sutra Sthana</i> 20/27

Brimhana Nasya	<i>Brimhana</i> – strengthens brain and nerves	6–8 drops per nostril (0.5–1 ml)	<i>Ardita, Kampa Vata</i> , weakness of sense organs	<i>C.S. Siddhi Sthana 9/89</i>
Shamana Nasya	Palliative – balances aggravated <i>Doshas</i>	4–6 drops per nostril	Headache, insomnia, mental fatigue	<i>S.S. Chikitsa Sthana 40/52</i>
Navana Nasya	Medicated oil or decoction drops – both cleansing and nourishing	6–10 drops per nostril	<i>Tamaka Shwasa, Moorchha, Apasmar</i>	<i>A.H. Sutra Sthana 20/22</i>

Type of Nasya	Purpose / Action	Dosage (Matra)	Indications	Classical Reference
Pradhamana Nasya	Dry powders (herbal) for <i>Kapha</i> disorders	Pinch-size dose blown into nostrils	<i>Kaphaja Shirashoola</i> , heaviness, dullness	<i>S.S. Chikitsa Sthana 40/58</i>
Marsha Nasya	Therapeutic form – used intermittently	6–10 drops per nostril	Chronic Vata-Kapha disorders	<i>C.S. Siddhi Sthana 9/90</i>
Pratimarsha Nasya	Daily-use, preventive form	2 drops per nostril (morning and evening)	Fatigue, stress, insomnia, premature aging	<i>A.H. Sutra Sthana 20/24</i>

Among the various types of *Nasya*, *Pratimarsha Nasya* can be considered a suitable option in the management of Parkinson's disease, as Parkinson's is predominantly a geriatric disorder. Classical Ayurvedic texts describe *Pratimarsha Nasya* as a safe form of *Nasya* that can be administered daily, even in children, elderly individuals, and debilitated patients. Owing to its very small dose of 2 *Bindu* in each nostril, it is well tolerated and can be safely continued for prolonged periods, making it particularly suitable for long-term management.

It can also be concluded that

- 1) *Nasya* supports *Prana Vata* and *Majja Dhatu*, the core elements governing neurological health.
- 2) When performed with proper method, *Nasya Karma* enhances mental clarity, strengthens the nervous system, and promotes overall well-being.
- 3) *Nasya Karma*, particularly *Pratimarsha Nasya*, is an effective Ayurvedic intervention for brain and head-related disorders.

- 4) By nourishing brain tissues and regulating *Vata*, *Nasya* not only treats diseases but also preserves cognitive health and vitality throughout life.

CONCLUSION

Parkinson's disease is a progressive neurodegenerative disorder that demands safe, effective, and long-term therapeutic approaches. Contemporary research has demonstrated the potential of the intranasal route as a direct pathway for delivering drugs to the brain through the olfactory and trigeminal neural pathways, thereby bypassing the blood–brain barrier. Interestingly, this concept resonates with the classical Ayurvedic principle of “*Nasa Hi Shiraso Dwaram*” the nose being the gateway to the head and brain.

Nasya Karma, one of the principal Panchakarma therapies, offers a rational Ayurvedic approach for addressing neurological disorders by facilitating the delivery of medicaments through the nasal route. Among its various forms, *Pratimarsha Nasya* is particularly advantageous in Parkinson's disease due to its minimal dosage, excellent safety profile, and suitability for daily administration, especially in geriatric and debilitated individuals. *Nasya Karma* may contribute to improved motor and cognitive health while promoting overall well-being.

Thus, the remarkable correlation between the Ayurvedic concept of *Nasya* and the modern understanding of nose-to-brain drug delivery highlights its potential as an integrative therapeutic strategy in Parkinson's disease. Further scientific validation through experimental and clinical studies may strengthen its role in the comprehensive management of neurodegenerative disorders.

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