

Panchakarma in Stroke Rehabilitation: Integrating Ayurvedic Principles with Contemporary Neuro-rehabilitation.

Abstract:

Stroke is a major neurological disorder and an important cause of long-term disability, frequently resulting in hemiparesis or hemiplegia, spasticity, impaired coordination, sensory disturbances, speech and language impairment, cognitive dysfunction and limitations in activities of daily living. Recovery following stroke is a multidimensional and long-term process that requires coordinated rehabilitation aimed at restoring functional abilities, promoting independence and improving quality of life. Modern stroke rehabilitation primarily utilizes physiotherapy, occupational therapy, speech and language therapy, cognitive rehabilitation, task-oriented training and other approaches based on the principles of neuroplasticity.

Ayurveda describes the clinical presentation of hemiplegia under the concept of *Pakshaghata*, predominantly considered a *Vata Vyadhi*. Classical Ayurvedic texts emphasize the importance of *Snehana*, *Swedana*, *Mridu Shodhana*, *Basti*, *Nasya* and other appropriate therapeutic measures in the management of *Pakshaghata*. *Panchakarma*, when selected according to *Dosha* involvement, *Avarana*, *Bala*, stage of disease and chronicity, may provide a therapeutic framework for addressing functional impairment and supporting the rehabilitation process.

The present article discusses the correlation between stroke and *Pakshaghata*, the role of neuroplasticity in functional recovery and the possible contribution of *Panchakarma* procedures such as *Abhyanga*, *Swedana*, *Virechana*, *Basti*, *Nasya* and *Murdhni Taila* in stroke rehabilitation. The emphasis is on an integrative model in which *Panchakarma* complements, rather than replaces, modern neurorehabilitation. Further clinical studies and standardized protocols are required to establish the efficacy, safety and appropriate sequencing of these interventions.

Keywords: Stroke, *Pakshaghata*, *Panchakarma*, Rehabilitation, Neuroplasticity, *Basti*, *Abhyanga*, *Swedana*.

1. Introduction

Stroke is a neurological emergency characterized by a sudden disturbance of cerebral function resulting from interruption of cerebral blood flow or bleeding within the intracranial vasculature. Depending on the area and extent of cerebral involvement, patients may develop motor, sensory, visual, speech, swallowing and cognitive impairments. Hemiparesis and hemiplegia are among the major disabling manifestations that significantly affect mobility, activities of daily living and quality of life.

Survival following the acute event does not necessarily indicate complete recovery. Many patients continue to experience residual motor impairment, abnormal muscle tone, contractures, impaired balance, loss of fine motor control, aphasia, dysarthria, dysphagia and cognitive disturbances. Therefore, rehabilitation constitutes an essential component of stroke

management. Modern rehabilitation involves a multidisciplinary approach incorporating physiotherapy, occupational therapy, speech and language therapy, cognitive rehabilitation, positioning, orthotic support and task-oriented functional training.

In *Ayurveda*, the clinical picture of hemiplegia can be understood under the broader concept of *Pakshaghata*, a *Vata*-dominant disorder. Classical descriptions emphasize unilateral loss of movement and perception associated with involvement of *Vata*. *Charaka* describes the condition as the impairment of one side of the body due to vitiated *Vata*¹, while *Sushruta* and *Vagbhata* describe impairment of the affected half of the body^{2,3}.

The management of *Pakshaghata* described in the classical texts includes *Snehana*, *Swedana*^{4,5}, *Mridu Shodhana*, *Basti* and other supportive measures⁶. These interventions can be considered in the context of rehabilitation, provided they are individualized according to the patient's strength, stage of disease, *Dosha* involvement, *Avarana* and associated manifestations.

Thus, this article explores the possibility of *Panchakarma* as an adjunctive rehabilitation strategy in stroke, with particular emphasis on its potential role in preparing the patient for active rehabilitation, reducing stiffness and providing sensory and functional support.

2. Objectives

- To understand the *Ayurvedic* concept of *Pakshaghata* and its clinical correlation with stroke.
- To review the role of modern neurorehabilitation in functional recovery after stroke.
- To understand the relevance of neuroplasticity in stroke rehabilitation.
- To explore the classical rationale for *Panchakarma* in *Pakshaghata*.
- To discuss the possible role of *Panchakarma* procedures in different stages and presentations of stroke rehabilitation.
- To propose an integrative approach combining *Panchakarma* with physiotherapy, occupational therapy, speech therapy and cognitive rehabilitation.

3. *Pakshaghata* – The *Ayurvedic* Perspective

Pakshaghata is described among the *Vata* disorders and is characterized predominantly by impairment of movement and function of one side of the body¹. The term is derived from *Paksha*, meaning one side, and *Aghata*, implying injury or impairment.

Charaka describes unilateral impairment caused by aggravated *Vata*, associated with loss of movement and, in some cases, pain, speech impairment and contraction of the affected limb⁷. *Sushruta* describes the affected half of the body becoming functionally impaired and insensitive⁸, while *Vagbhata* similarly explains the involvement of one side through *Vata* affecting *Sira* and *Snayu* and disturbing normal joint and functional integrity⁹.

Nidana

The etiological factors described for *Vata* aggravation include excessive intake of *Ruksha*, *Sheeta* and *Laghu Ahara*, inadequate food intake, excessive exertion, excessive travel, swimming, excessive sexual activity, irregular lifestyle, suppression of natural urges, day sleep and psychological factors such as *Chinta*, *Shoka*, *Krodha* and *Bhaya*. Trauma and injury to vital structures are also described as immediate precipitating factors¹⁰.

Samprapti

The general pathogenesis involves aggravation of *Vata* followed by its movement through the channels and localization at a site of *Khavaigunya*. In *Pakshaghata*, classical descriptions emphasize the involvement of *Sira* and *Snayu*, with disturbance of movement and function of one side of the body. Here, *Vata* is the predominant *Dosha*, with possible *Kapha* or *Pitta* association, and describes *Madhyama Rogamarga* involvement².

The major *Samprapti Ghataka* described include *Vata*, particularly *Prana*, *Udana* and *Vyana* *Vayu*, with possible *Kapha/Pitta Samsarga*; *Rasa*, *Rakta*, *Mamsa*, *Medas* and *Majja* as *Dhatu*; *Sira* and *Snayu* as *Upadhatu*; and involvement of *Rasavaha*, *Raktavaha*, *Mamsavaha* and *Medovaha Srotas*.

4. Correlation of Stroke with Pakshaghata

Stroke and *Pakshaghata* are not considered identical entities, but a clinical correlation can be established based on their manifestations. Stroke may produce unilateral motor impairment, sensory deficits, speech disturbances and cognitive dysfunction, while *Pakshaghata* is characterized by unilateral impairment of movement and function.

The correlation is therefore primarily clinical and functional rather than a direct one-to-one pathological equivalence. Modern stroke diagnosis is based on neurological assessment and neuroimaging, whereas Ayurvedic assessment considers *Dosha*, *Dushya*, *Srotas*, *Avarana*, *Bala*, stage and chronicity.

From a rehabilitation perspective, the common ground lies in the functional consequences—loss of movement, altered muscle tone, impaired coordination, sensory dysfunction and difficulty performing activities of daily living.

5. Stroke and its Rehabilitation

Stroke can broadly be categorized into ischemic and hemorrhagic stroke. Ischemic stroke results from interruption of cerebral blood flow due to vascular occlusion, while hemorrhagic stroke results from bleeding within or around the brain.

The clinical manifestations vary according to the vascular territory involved. Anterior cerebral artery involvement predominantly affects the lower limb, whereas middle cerebral artery involvement commonly produces contralateral upper-limb weakness and may be associated with aphasia. Posterior cerebral artery involvement can produce visual and higher cortical disturbances, while vertebrobasilar involvement may result in cerebellar, brainstem, cranial nerve and swallowing abnormalities. Diagnosis is established using appropriate investigations such as CT, MRI, MR angiography and carotid Doppler, depending on the clinical situation.

6. Modern Stroke Rehabilitation

Rehabilitation begins as early as clinically appropriate and continues according to the patient's functional status.

Acute stage

The acute stage is primarily concerned with stabilization and prevention of secondary complications. Proper positioning, gentle mobilization, passive and active-assisted range-of-motion exercises, bed mobility and prevention of pressure sores, contractures and other complications are emphasized.

Subacute stage

During the subacute stage, rehabilitation becomes progressively intensive. Physiotherapy, occupational therapy and speech and language therapy are combined with strengthening, weight-bearing, balance training, coordination exercises and task-specific activities.

Chronic stage

The chronic stage focuses on long-term functional recovery, management of residual disability and reintegration into daily and community activities. Gait training, endurance exercises, cognitive rehabilitation and advanced modalities may be incorporated according to individual requirements.

Thus, stroke rehabilitation should be viewed as a continuous process rather than a short-term intervention.

7. Neuroplasticity – The Basis of Functional Recovery

Neuroplasticity refers to the capacity of the nervous system to reorganize its structure and function in response to injury, learning and environmental demands. Following stroke, functional recovery may involve adaptation and reorganization of neural networks.

The principles relevant to rehabilitation: increased use of a body part can influence its cortical representation; both ipsilateral and contralateral hemispheres can contribute to motor control; sensory stimulation can enhance plasticity; and reduction of inhibitory factors may facilitate participation in rehabilitation.

This provides an important conceptual bridge between Panchakarma-based supportive interventions and active rehabilitation. Panchakarma may be viewed as a preparatory and supportive component, while repetitive, meaningful and task-specific rehabilitation provides the essential functional stimulus for neuroplastic adaptation.

8. Rehabilitation Through Panchakarma

Ayurvedic management of *Pakshaghata* is individualized rather than based on a single universal procedure. The *Samprapti Vighatana* and selection of treatment according to *Avarana* or *Dhatu-kshaya*, stage of disease, strength and associated manifestations.

The broad therapeutic principles can be summarized as:

Vata management → *Srotoshodhana* → *Vata Shamana* → *Brimhana/Balya* → support of *Indriya* and *Prana* → facilitation of rehabilitation.

1 Abhyanga

Abhyanga occupy an important place in the management of *Vata* disorders. In the rehabilitation setting, *Abhyanga* may be considered particularly when stiffness, spasticity, muscular discomfort or restricted mobility are present.

The classical rationale that *Abhyanga* promotes firmness and strength of the body and pacifies Vata, while also emphasizing the role of tactile stimulation. From a rehabilitation perspective, gentle tactile and proprioceptive input may complement active therapeutic exercises. *Abhyanga* should therefore be viewed as a supportive intervention that prepares the body for subsequent active rehabilitation, rather than as a substitute for exercise.

2.Swedana

Swedana is described as reducing stiffness, heaviness and coldness. In *Pakshaghata*, different forms of *Swedana* may be selected according to the clinical presentation such as *Upanaha*, *Parisheka*, *Agni lepa* and *Pinda Sweda* among the possible approaches.

In patients with stiffness and restricted mobility, appropriately selected *Swedana* may facilitate relaxation and mobility, potentially making subsequent physiotherapy and stretching easier. However, selection should be individualized, especially in patients with altered sensation, cardiovascular instability or other contraindications.

3.Udwartana and Ruksha Sweda in Avarana

Not every presentation of *Pakshaghata* is necessarily treated with excessive *Snigdha* measures. When *Kapha* or *Meda* involvement and *Avarana* are prominent, the PPT discusses Rukshana-oriented interventions such as *Udwartana*, *Dhanyamla Dhara*, *Agni lepa* and *Ruksha Pinda Sweda*. *Udwartana* is presented particularly in *Kapha-Avarita Vata*, while *Ruksha Pinda Sweda* is mentioned in presentations involving pain and coldness. This highlights the importance of *Ayurvedic* phenotyping of the patient rather than applying one *Panchakarma* protocol to every stroke survivor.

4 Virechana

Classical references describe *Virechana* in the management of *Pakshaghata*. *Charaka* advises *Swedana* along with appropriate *oleation* and *Virechana*, while *Vagbhata* also describes *Virechana* following *Snehana* in *Pakshaghata*. In *Avarana*-dominant presentations, there is a need for *Mridu Shodhana* rather than excessively strong purification. It also relates *Virechana* to the management of *Pakvashaya-gata Vata*. Therefore, *Virechana* should not be considered a routine intervention for every stroke patient. Its consideration depends on factors such as Dosha involvement, *Avarana*, strength, digestive capacity, chronicity and overall clinical stability.

5 Basti

Basti is particularly important in the *Ayurvedic* management of *Vata* disorders. It is for *Vata* management with potential *Brimhana*, *Balya* and *Dhatu-poshana* effects depending on the formulation and type selected. Various *Niruha* and *Anuvasana Basti* formulations are described according to clinical presentation.

From a rehabilitation perspective, *Basti* may be considered particularly in chronic *Vata*-dominant conditions, wasting, weakness and selected neuromuscular manifestations. The selection of *Niruha* versus *Anuvasana Basti*, formulation, dose and timing must be individualized rather than standardized solely on the diagnosis of stroke.

6 Nasya

Nasya is another intervention discussed in relation to *Pakshaghata*. The classical basis in the association between *Pakshaghata* and *Ardita* and the use of *NavanaNasya* in *Ardita*. *Rechana* and *Shamana Nasya* are mentioned according to the stage and clinical requirement. In the context of rehabilitation, *Nasya* may be considered when appropriate in patients with associated cranial, sensory, speech or higher-function manifestations. However, its role should be regarded as complementary and should not replace evidence-based speech, swallowing or neurological rehabilitation.

7 Murdhni Taila

Murdhni Taila procedures such as *Shirodhara*, *Shiro Pichu* and *Shiro Basti* are mentioned as supportive interventions. These procedures may have a role in promoting relaxation and providing sensory stimulation, particularly in selected patients with associated cognitive or psychological manifestations. The proposed mechanisms should be regarded as conceptual hypotheses, and stronger clinical evidence is required before attributing specific neurological effects.

9. Panchakarma According to Functional Manifestations

An important strength of an Ayurvedic rehabilitation model is the possibility of selecting interventions according to the patient's dominant functional problem.

Spasticity and contracture - *Abhyanga* and appropriately selected *Swedana* may be considered to reduce stiffness and facilitate movement before active physiotherapy.

Cognitive impairment - *Thalam*, *Shirodhara*, *Talapothichil*, *Karnapoorana*, *Ksheeradhooma* and *Jihwa Lepana* as supportive measures. These should be considered adjunctive interventions, while cognitive rehabilitation remains central.

Speech disturbance - *Ayurvedic* formulations and local applications are described for speech-related disturbances. These should complement, rather than replace, structured speech and language therapy.

Memory disturbance - Several *Medhya*-oriented formulations are mentioned in relation to memory disturbance.

10. Integration of Panchakarma with Modern Rehabilitation

The most appropriate approach is not to consider *Ayurveda* and modern rehabilitation as competing systems. Instead, *Panchakarma* may be incorporated as a supportive and preparatory component within a multidisciplinary rehabilitation programme.

A conceptual sequence may be represented as:

Stroke → Neurological stabilization → Ayurvedic assessment → Identification of *Dosha/Avarana/Bala/Stage* → Appropriate *Panchakarma* or supportive procedure → Improved mobility, relaxation and sensory input → Active physiotherapy/occupational therapy/speech therapy → Repetitive task-specific training → Functional independence.

This integrated approach recognizes that *Panchakarma* alone cannot provide the complete range of rehabilitation required after stroke. Physiotherapy is necessary for motor retraining, occupational therapy for activities of daily living and fine motor function, speech therapy for

aphasia, dysarthria and dysphagia, and cognitive rehabilitation for memory, attention and executive dysfunction. Thus, the potential role of *Panchakarma* is to complement the rehabilitation environment and facilitate participation in active functional training.

11. Stage-wise Concept of Panchakarma-Based Rehabilitation

Acute stage

The priority remains medical stabilization, prevention of complications and appropriate early mobilization. *Panchakarma* should not interfere with emergency stroke management. Any *Ayurvedic* intervention should be considered only after appropriate medical stabilization and individualized assessment.

Subacute stage

Once the patient is medically stable, selected *Snehana*, *Abhyanga*, *Swedana* and other appropriate interventions may be incorporated alongside physiotherapy and occupational therapy. The focus is progressively shifted toward restoration of movement, balance, coordination and functional activities.

Chronic stage

In chronic residual disability, individualized *Panchakarma* and other supportive measures may be considered according to *Dosha* predominance, stiffness, wasting, pain, weakness, *Avarana* and other associated manifestations. *Basti*, *Abhyanga*, *Swedana*, *Nasya* and *Rasayana*-oriented approaches may be considered where appropriate.

12. Discussion

The central question in stroke rehabilitation is not merely how to reduce symptoms but how to restore meaningful function. Modern rehabilitation achieves this through repeated practice, sensory input, task-specific activities and neuroplastic adaptation. *Ayurveda* provides a different but potentially complementary framework through assessment of *Dosha*, *Dhatu*, *Srotas*, *Avarana*, *Bala* and disease stage.

The classical management of *Pakshaghata* gives importance to *Snehana*, *Swedana*, *Mridu Shodhana*, *Basti* and other individualized measures. These principles may be interpreted within a rehabilitation framework as interventions that potentially address stiffness, pain, mobility restriction, weakness and general functional readiness.

The relationship between *Panchakarma* and neuroplasticity should, however, be presented cautiously. While sensory stimulation, repeated movement and active task-oriented practice are established principles of neurorehabilitation, direct claims that *Panchakarma* independently induces neuroplasticity require further scientific validation.

13. Conclusion

Panchakarma provides an individualized supportive approach in stroke rehabilitation, particularly for residual stiffness, weakness, pain and functional limitations. *Abhyanga, Swedana, Mridu Shodhana, Basti, Nasya* and *Murdhni Taila* may be selected according to the patient's *Dosha, Avarana, Bala* and stage of disease. Integration with modern neurorehabilitation may facilitate functional recovery, but *Panchakarma* should complement rather than replace evidence-based rehabilitation. Further clinical studies are required to establish its efficacy, safety and standardized protocols.

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