



FROM SCALP TO SYNAPSE: SCIENTIFIC INSIGHTS INTO THE THERAPEUTIC MECHANISMS OF SHIROBASTI

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ABSTRACT

Shirobasti is one of the important *Murdha Taila* procedures described in *Ayurveda*, in which warm medicated oil is retained over the head for a specified duration using a specially designed cap. *Acharyas* have considered *Shiras* as the seat of *Prana*, *Indriyas*, and vital structures, highlighting its significance in maintaining physical and mental health. *Shirobasti* is widely indicated in disorders of the head, scalp, and nervous system, including headaches, insomnia, stress, anxiety, neurological disorders, and scalp diseases. The therapeutic effects of *Shirobasti* are attributed to the combined action of warm medicated oil, prolonged contact with the scalp, and the balancing of *Vata* and *Pitta* doshas. Scientifically, the rich vascular and neural network of the scalp may facilitate transdermal absorption of lipid-soluble constituents, improve local circulation, and produce systemic neurophysiological effects. Besides alleviating disease, *Shirobasti* promotes mental relaxation, nourishes the scalp, and enhances overall well-being. Although the procedure has been extensively described in classical *Ayurvedic* texts and is widely practiced clinically, further scientific studies are required to establish its mechanism of action, standardization, and evidence-based therapeutic efficacy.

KEYWORDS: *Shirobasti*, *Agni*, Circulation, *Nyaya*.

INTRODUCTION

Shirobasti is one of the *Murdha Taila* treatments in *Ayurveda* used to address conditions affecting the head, neck, and nervous system. According to *Acharya Charaka*, *Sneha* is a therapy that brings smoothness, softness, stability, and strength to the body.^[1]

Among external *Sneha* therapies, *Murdha Taila* includes *Shiro Abhyanga*, *Shiro Parisheka* (also known as *Shirodhara*), *Shiro Pichu*, and *Shirobasti*, with *Shirobasti* being regarded as the most effective because it involves

keeping warm medicated oil on the scalp for a longer time.^[2]

The term "*Murdha*" refers to the head, and "*Basti*" means retention or holding. Therefore, *Shirobasti* is a procedure in which warm medicated oil is retained on the head inside a leather or appropriate cap for a specific period. *Acharya Charaka* describes the head as the *Uttamanga*, or supreme organ, and the root of the body, as it is the location of *Prana*, the sensory organs, and higher neurological functions.^[3] *Acharya Sushruta* also

highlights its significance by mentioning 37 *Marmas* located in the head area.^[4]

Shirobasti mainly helps to calm an aggravated *Vata Dosha*, nourish the scalp and nervous system, and support the health of *Indriyas*, *Majja*, *Rakta*, and the entire body.^[5] Classical Ayurvedic texts recommend this treatment for various neurological, psychosomatic, and scalp-related disorders. From a modern anatomical perspective, the scalp is well-supplied with blood vessels, nerves, hair follicles, sebaceous glands, and emissary veins, making it an effective route for the transdermal absorption of medicated oils. This contributes to both local and systemic therapeutic benefits.

Procedure of *Shirobasti*

Appropriate season for *Shirobasti Karma*

According to *Sharangadhara Samhita*, *Shirobasti* can be done in all the six seasons of the year. “*Sarvakareshu Yujyate*”.^[6]

Kala of *Shirobasti Karma*

According to *Sushruta Samhita*, *Shirobasti* should be done in the afternoon

According to *Vagbhata*, *Shirobasti* should be done at “*Dinaante*”.^[7]

Sharangadhara Samhita suggests that *Shirobasti* is to be done in the morning, while the patient has not taken his food.^[8]

Measurements of the *Shirobasti cap*.^[10,11,12]

Author	Height	Width
<i>Sharangadhara, Vagbhata</i>	12 <i>Angula</i> (9 inches approximately)	<i>Shirapramana</i> (Circumference of head)
<i>Dharakalpa</i>	12 <i>Angula</i>	<i>Shirasama</i> (Circumference of head)
<i>Vrundhamadhava, Chakradatta</i>	16 <i>Angula</i> (12 inches)	Circumference of head

This disparity in the opinion of *Vrundamadhava* on the height of the cap is clarified as follows.

The lower 3 *Angula* of the cap is covered with the strap of cloth by which it is tied tight to the head. The upper 1 *Angula* of the container is left free without *Sneha dravya* (medicated oil). Thus, leaving these 4 *Angula*, the rest 12 *Angula* is filled by the *Sneha dravyas*.

The materials used for *Shirobasti kosha* are the skins of cows, buffalos, or a Leather strap. It should be open at both ends (*Dwimukho*).

Preparation and tying of *Shirobasti cap*

Masha kalka (horse gram paste) is prepared using *Sukhoshna jala*.

A long cloth strap, of the width of 3 *Angula* smeared with the paste of *Masha kalka* is tied around the head along the margin of the hair. The cap of a leather strap is fixed around the head's lower end reaching up to the

Materials Required

- Charampatta* (leather) – 1
- Masha* (black gram flour) - 250 gm
- Taila* - 1.5 to 2 litres
- Utensils such as spoon, container
- Cotton ribbon (2 strips)
- Taila* for *Abhyanga*
- Towel
- Armed Chair (with the height equal to the patient's knee with a soft seating base)
- Therapist

According to *Sushruta Samhita*

Purvakarma: (Pre-therapeutic measures)

Preparation of patient

Shodhana: The patient is prepared for *Shirobasti* by administering *Vamanadi shodhana* initially (purification procedures).

The patient is subjected for *Snehana* and *Swedana* (*Abhyanga* and Steam).

Bhojana: In the evening, the patient is advised to take *pathya ahara* (wholesome diet) according to *Vyadhi* (disease).

The patient should be on an empty stomach

The patient is made to sit in an erect posture on a knee-height chair comfortably (*Rijvaseena*).

Later, *Bastikosha* (*shirobasti cap*) is tied over the patient's head.^[9]

ears. A cloth strap smeared with *Masha kalka* is wrapped above the lower border of the cap again. The borders of the cap are again smeared with the *Masha kalka* to prevent leaking.^[13,14]

Pradhana Karma: (Main procedure)

The *Sneha* which is selected according to *Vyadhi* is filled inside the *Shirobasti Cap*.

Temperature of the oil should be maintained throughout the procedure. The temperature of the *Sneha* needs to be *Sukoshna*.^[15] Table 2 shows the quantity of *Sneha* to be filled into the *Shirobasti cap* according to different *Acharyas*. Table 3 shows the retention time of the *taila* according to the vitiated doshas. The duration of retention according to *Bhavaprakasa* is 1 *Yama* / *Yamardha* and *Yogarathnakara* is 1 *prahara* / ½ *prahara*.

Table 2: Quantity of *Sneha*.^[16]

Author	Quantity
<i>Ashtanga Hridaya</i>	1 <i>Angula</i> above the scalp (1.9cm/0.75 inches)
<i>Dalhana, Dharakalpa</i>	2 <i>Angula</i> above the scalp (1.5 inches approximately)
<i>Tatvachandrika teeka</i>	1 <i>Angula</i> above the scalp
<i>Vyakyakusumavalli</i>	1 <i>Angula</i> above the scalp or 5-6 <i>Angula</i>

Table 3: Retention time of the *taila* according to *dosha*.^[17,18,19]

<i>Dosha</i>	<i>Chakradatta</i>	<i>Ashtanga Hridaya, Sushruta</i>	<i>Jejjata</i>	<i>Gayadasa</i>
<i>Vata</i>	1000 <i>matrakala</i>	10,000 <i>matrakala</i> (~53min)	10,000 <i>matrakala</i>	
<i>Pitta</i>	800 <i>matrakala</i> /1 <i>yama</i>	8,000 <i>matrakala</i> (~43min)	-	-
<i>Kapha</i>	500 <i>matrakala</i> / ½ <i>yama</i>	6,000 <i>matrakala</i> (~31min)	-	-
<i>Swastha</i>	-	1000 <i>matrakala</i> (~5-6 min)	-	1000 <i>matrakala</i>

Paschat karma (post-therapeutic measures)

Oil should be removed with the help of a spoon or sponge after assessing *Samyak lakshanas*.

Remove the *Shirobasti* cap. *Skandhadi mardana* (massage should be done to the shoulder, head, neck, etc.) is to be done to the patient. *Urdhvakaya snana* with *koshnaja* (Advice to take a head bath with lukewarm water) is advised for the patient. Later, *Rasnadi churna* is applied over the vertex.^[21]

Precautions: Throughout the process, it is important to keep the oil at the same temperature. It should be around 40° C ± 1 degrees, neither too hot nor too cold. To prevent oil leaking, make sure there is no gap at the junction of the scalp and the *Shirobasti* cap while sealing. Additionally, the strap of the cloth should be fastened so that it is neither too tight, which can irritate, nor too slack, which can cause leakage.

Duration of administering *Shirobasti*^[21,22]

Author	Duration
<i>Dharakalpa and Vagbhata</i>	7 days (<i>Param Saptaham</i>)
<i>Ashtanga Sangraha, Shreedas</i> (in <i>Shirasekhavidhi adhyaya</i>)	3,5,7 days
<i>Adamalla</i> (<i>Deepika</i> commentary)	1 day to <i>Rogasankshaya</i>
<i>Sharangadhara</i>	5 days/a week (<i>Panchasaptahameva</i>)
<i>Yogarathnakara</i>	5,6 or 7 days

Indications and Contraindications of *Shirobasti*.^[23,24]

Reference	Indication	Contraindication
<i>Vagbhata</i>	<i>Netrastambha</i> <i>Prasupthi</i> <i>Ardita</i> <i>Jagara</i> <i>Nasa asya shosha</i> <i>Timira</i> <i>Daruna Shiroroga</i>	<i>Kaphaja roga</i>
<i>Chakradatta</i> <i>Shiroroga adhikara</i>	<i>Shiroroga</i> due to <i>vata</i> <i>Hanu, Manya, Akshi, Karna roga</i> <i>Ardita Shirakampa</i>	

Mode of action of *Shirobasti*

Shirobasti is a specialized form of *Murdhni Taila* in which medicated oil is retained over the scalp for a specific duration, allowing prolonged contact between the drug and the scalp. Pro drug (*taila*) is used in *Shirobasti*. The quantity of the *taila* used in *Shirobasti* acts as hydrolic pressure (due to gravity). Unlike oral administration, the drug enters through the trans-appendageal pathway, mainly via hair follicles and sebaceous glands, which serve as natural channels for drug penetration^[25] in the *twacha* (*Bhrajaka pitta*) releases prodrug compound. The lipophilic nature of *Taila* facilitates the transport of phytocompounds across

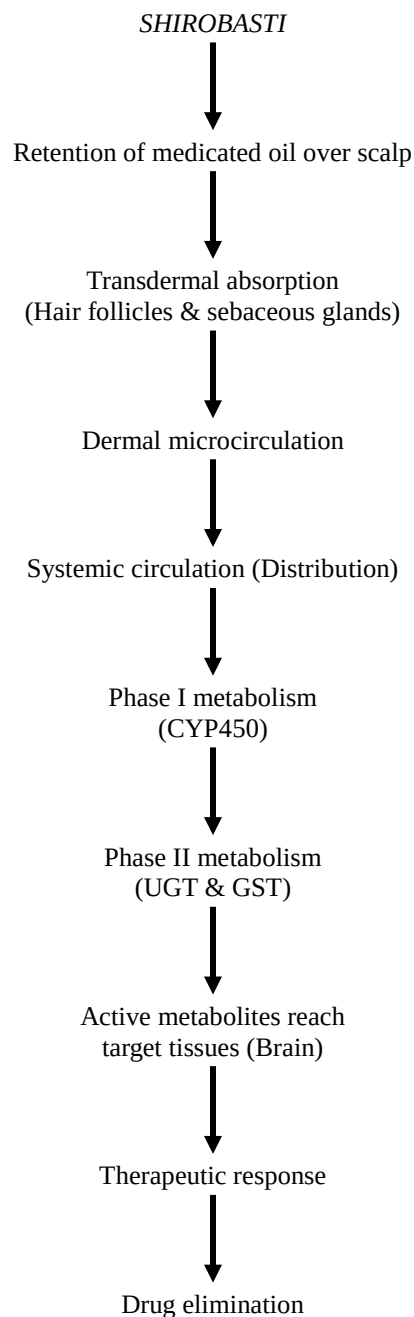
the lipid-rich layers of the skin. In *Ayurveda*, the *Samskara* (processing) of the medicated oil enhances the stability and potency of the phytoconstituents, keeping them in a stable yet biologically inactive form until they reach the target tissue. The prolonged retention time in *Shirobasti* increases drug residence over the scalp, thereby improving absorption and ensuring sustained delivery of the active principles.

Once absorbed, the phytoconstituents enter the systemic circulation or local neural tissues, where they undergo biotransformation. Initially, many phytocompounds are bound to proteins, fatty acids, or glycosides in an inert

form. During metabolism, Phase I reaction, predominantly mediated by the Cytochrome P450 enzyme system (CYP450), oxidize these compounds and convert them into pharmacologically active but inert intermediates.^[26] These metabolites subsequently undergo Phase II conjugation, mainly through enzymes such as UDP-glucuronosyl transferase (UGT) and Glutathione-S-transferase (GST), which attach hydrophilic groups to the molecules.^[27] This conversion transforms lipophilic compounds into water-soluble metabolites that can be distributed efficiently, exert therapeutic effects, and later be eliminated through urine, bile, or sweat. Thus, *Shirobasti* facilitates both local and systemic actions by promoting absorption, distribution, metabolism, and elimination (ADME) of the phytoconstituents.

The therapeutic response to *Shirobasti* is influenced by *Agni* by *tara tama bhava*, which determines the body's capacity to transform and utilize the absorbed drug. Individuals with *Samagni* exhibit optimum metabolism and better therapeutic outcomes, whereas *Mandagni*, *Tikshnagni*, or *Vishamagni* may alter the drug response due to variations in metabolic efficiency. This concept closely resembles the modern phenomenon of genetic polymorphism, wherein inherited variations in metabolic enzymes such as CYP450, UGT, and GST influence the rate of drug metabolism and therapeutic efficacy. Therefore, the action of *Shirobasti* is not merely due to passive diffusion of medicated oil but results from a complex interaction between transdermal drug delivery, enzymatic activation of phytocompounds, individual metabolic capacity, and Ayurvedic principles of *Agni* and *Samskara*.

The mechanism of action of *Shirobasti* can be interpreted through three classical *Ayurvedic Nyayas*, which closely parallel modern pharmacokinetic principles. *Kedara Kulya Nyaya* explains about the trans-appendageal absorption and distribution of medicated oil phytoconstituents through hair follicles and sebaceous glands, similar to water reaching different fields through irrigation channels, representing drug absorption and distribution. *Khale Kapota Nyaya* describes the selective uptake of phytoconstituents by CYP450 enzymes, just as pigeons selectively pick grains from the floor, different Cytochrome P450 isoenzymes (CYP3A4, CYP2D6, CYP2C9, etc.) selectively recognize and metabolize only specific phytoconstituents (substrates). This explains the specificity of drug metabolism. Subsequently, *Ksheera Dadhi* describes the transformation of the selected phytoconstituents by CYP450 (Phase I) followed by conjugation through UGT and GST (Phase II) into hydrophilic metabolites that can be excreted.^[28] These *Nyaya's* provides a classical Ayurvedic framework to explain the processes of absorption, selective tissue distribution, metabolic activation, and therapeutic action of *Shirobasti*, thereby establishing a scientific bridge between traditional Ayurvedic concepts and modern pharmacology.



DISCUSSION

Shirobasti represents a unique therapeutic procedure in Ayurveda that integrates classical principles with emerging scientific concepts of transdermal drug delivery. The prolonged retention of warm medicated oil over the scalp facilitates sustained contact with hair follicles and sebaceous glands, allowing absorption of lipophilic phytoconstituents while bypassing the gastrointestinal tract. The article correlates this process with modern pharmacokinetic principles such as absorption, distribution, metabolism, and elimination (ADME), emphasizing the role of CYP450, UGT, and GST enzymes in drug biotransformation. Furthermore, Ayurvedic concepts including *Bhrajaka Pitta*, *Agni*, *Samskara*, and the *Nyayas*—*Kedara Kulya*, *Khale*

Kapota, and *Ksheera Dadhi* provide a logical framework to explain the selective uptake, metabolic transformation, and therapeutic action of medicated oils. This integrative interpretation strengthens the scientific rationale of *Shirobasti* while preserving its classical Ayurvedic foundation.

CONCLUSION

Shirobasti is a valuable *Murdhni Taila* therapy with significant therapeutic potential in neurological, psychosomatic, and scalp disorders. Its efficacy is attributed to the synergistic effects of prolonged oil retention, transdermal absorption of phytoconstituents, improved local circulation, and modulation of neurophysiological functions. By correlating Ayurvedic principles such as *Agni*, *Bhrajaka Pitta*, *Samskara*, and classical *Nyayas* with modern pharmacological mechanisms, the procedure can be understood through a contemporary scientific perspective without compromising its traditional essence. Although these conceptual correlations provide a strong theoretical basis, well-designed experimental and clinical studies are essential to validate the proposed mechanisms, standardize the procedure, and establish evidence-based therapeutic applications of *Shirobasti* in modern clinical practice.

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