WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 21, 559-570. Review Article ISSN 2277–7105

A CRITICAL REVIEW OF THE ROLE OF PANCHAKARMA PROCEDURES IN HAIR AND HAIR HEALTH

Dr. Ravikanth Shilavanthar*[1] Pg Scholar, Dr. Venkanna S. Kanthi Md (Ayu) Professor and Hod[2], Dr. Vijaykumar Math[3]

Associate Professor, Bhagawan Mahaveer Jain Ayurvedic Medical College, and Pg Centre Gajendragad-582114, Karnataka.

Article Received on 02 Oct. 2026,
Article Revised on 22 Oct. 2026,
Article Published on 01 Nov. 2026,

https://doi.org/10.5281/zenodo.23760727

***Corresponding Author**

Dr. Ravikanth Shilavanthar

Pg Scholar, Associate Professor, Bhagawan Mahaveer Jain Ayurvedic Medical College, and Pg Centre Gajendragad-582114, Karnataka.

How to cite this Article: Dr. Ravikanth Shilavanthar*[1] Pg Scholar, Dr. Venkanna S. Kanthi Md (Ayu) Professor And Hod[2], Dr. Vijaykumar Math[3] (2026). A Critical Review Of The Role Of Panchakarma Procedures In Hair And Hair Health. World Journal of Pharmaceutical Research, 15(21), 559–570.
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ABSTRACT

Hair is an important appendage of the skin that contributes not only to physical appearance but also to thermoregulation, sensory perception, and protection against environmental factors. Hair growth is a dynamic biological process regulated by genetic, hormonal, nutritional, neural, vascular, and immunological factors. Disturbances in these regulatory mechanisms lead to various hair disorders such as alopecia, premature graying, and excessive hair shedding, which significantly affect an individual's quality of life. *Ayurveda* describes *Kesha* (hair) as the *Mala* of *Asthi Dhatu* and emphasizes the importance of balanced *Tridosha*, healthy *Dhatus*, and proper nourishment for maintaining healthy hair. Various *Ayurvedic* procedures including Nasya *Karma*, *Shiroabhyanga*, *Shirodhara*, *Shiro Pichu*, *Shiro Basti*, *Shiro Lepa*, *Prachanna*, and *Raktamokshana* have traditionally been employed to improve scalp health and promote hair growth. Modern scientific evidence suggests that these procedures enhance local blood circulation, improve nutrient delivery, reduce oxidative stress, modulate neuroendocrine responses, and improve follicular function. This review integrates contemporary understanding of hair physiology with classical *Ayurvedic* concepts and discusses the probable mechanisms by which *Ayurvedic* procedures support hair growth and scalp health.

KEYWORDS: Hair physiology, *Kesha*, *Ayurveda*, *Nasya*, *Shiroabhyanga*, Hair follicle, Hair growth cycle, *Murdhni Taila.*

INTRODUCTION

Hair is one of the most specialized appendages of the skin and serves several physiological functions including protection from ultraviolet radiation, thermoregulation, sensory perception, and social communication. Approximately five million hair follicles are present in the human body, of which nearly 100,000 are located on the scalp. Hair growth follows a cyclic process consisting of anagen, catagen, telogen, and exogen phases. This cycle is regulated by multiple molecular signaling pathways involving growth factors, hormones, cytokines, and stem cells.

Hair disorders have become increasingly common due to stress, nutritional deficiencies, endocrine disorders, environmental pollution, lifestyle modifications, and aging. Androgenetic alopecia, telogen effluvium, alopecia areata, and premature canities are among the most prevalent conditions affecting both men and women.

Ayurveda provides a comprehensive explanation regarding the origin, development, nourishment, and pathology of *Kesha*. According to *Acharya Charaka* and *Acharya Sushruta*, *Kesha* is considered the *Mala* of *Asthi Dhatu*, while its nourishment depends upon proper functioning of *Rasa Dhatu* and balanced *Tridosha*. Hair quality reflects the overall health of *Dhatus* and *Agni*.

Among various *Ayurvedic* therapeutic approaches, *Murdhni Taila* procedures, *Nasya Karma*, *Shiro Lepa*, and *Raktamokshana* occupy an important place in the management of hair disorders. Understanding the scientific basis of these procedures may help bridge traditional knowledge with modern dermatological concepts.

Therefore, this review aims to integrate current knowledge of hair growth physiology with *Ayurvedic* principles and explain the possible mechanisms through which *Ayurvedic* procedures promote hair health.

METHODOLOGY

This review article was prepared through a comprehensive narrative review of both classical *Ayurvedic* literature and contemporary biomedical publications.

Sources of Literature

Ayurvedic Literature

- Charaka Samhita
- Sushruta Samhita
- Ashtanga Hridaya
- Kashyapa Samhita
- Sharangadhara Samhita
- Kriya Shareera textbooks
- Ayurvedic dermatology literature

REVIEW OF LITERATURE

Hair Physiology

Hair develops from epidermal cells that invaginate into the dermis to form the hair follicle. The follicle consists of the hair bulb, dermal papilla, hair matrix, inner and outer root sheath, sebaceous gland, and arrector pili muscle.

The dermal papilla acts as the biological control center for hair growth by supplying nutrients and signaling molecules that regulate follicular stem cells.

Hair Growth Cycle

Hair growth occurs in four phases.

Anagen

- Active growth phase
- Lasts 2–7 years
- Around 85–90% of scalp hairs remain in this phase

Catagen

- Regression phase
- Lasts 2–3 weeks
- Programmed apoptosis occurs

Telogen

- Resting phase
- Lasts approximately 3 months

Exogen

- Shedding phase
- Old hair falls and new anagen hair emerges

Factors Regulating Hair Growth

Hair growth is influenced by.

- Genetics
- Nutrition
- Blood circulation
- Hormones
- Cytokines
- Stem cells
- Immune responses
- Stress
- Neural regulation

Hormonal influences include.

- Androgens
- Estrogen
- Thyroid hormones
- Cortisol
- Growth hormone

Ayurvedic* Concept of *Kesha

According to Ayurveda

- *Kesha* is *Mala* of *Asthi Dhatu.*
- *Kesha* originates from *Pitruja Bhava.*
- Proper nourishment depends upon *Rasa Dhatu*.
- Hair health depends upon balanced *Tridosha*.
- *Vata* regulates development.
- *Pitta* provides pigmentation.
- *Kapha* provides lubrication and strength.

Astanga Hridaya states that *Kesha* develops during the sixth month of intrauterine life.

Panchakarma Procedures for Hair Health

Nasya Karma

Nasya stimulates the richly vascular nasal mucosa and cranial nerves. The medicines may reach deeper tissues through neural and vascular pathways. Increased scalp perfusion improves follicular nutrition while reducing stress-mediated hair loss.

Shiroabhyanga

Scalp massage improves

- Blood circulation
- Lymphatic drainage
- Sebum distribution
- Muscle relaxation
- Parasympathetic activity

Mechanical stimulation also promotes nutrient delivery to hair follicles.

Shirodhara

Continuous pouring of medicated liquids over the forehead induces deep relaxation through autonomic modulation. Studies suggest reduction in cortisol levels and normalization of serotonin, which may prevent stress-induced telogen effluvium.

Shiro Pichu and *Shiro Basti*

These procedures provide prolonged contact of medicated oils with the scalp, allowing enhanced absorption of phytochemicals. Their *Snigdha* and *Vatahara* properties nourish hair roots and improve scalp microcirculation.

Shiro Lepa

Application of medicated paste improves local blood flow through mild *Ushna* effects and vasodilatation. Enhanced circulation promotes better nutrient supply and facilitates removal of inflammatory mediators.

Prachanna and *Raktamokshana*

Localized bloodletting may reduce inflammatory mediators, improve local circulation, and stimulate tissue regeneration. Improved oxygenation and nutrient delivery may support dormant hair follicles.

DISCUSSION

Hair growth is a highly regulated physiological process that depends on the coordinated interaction of genetic, endocrine, neural, vascular, nutritional, and immunological factors. The hair follicle is recognized as a dynamic mini-organ that continuously undergoes cyclic remodeling through the anagen, catagen, telogen, and exogen phases. Maintenance of this cycle requires adequate blood supply, oxygenation, growth factors, stem-cell activation, hormonal balance, and immune privilege. Disturbance in any of these regulatory mechanisms results in hair disorders such as androgenetic alopecia, telogen effluvium, alopecia areata, and premature graying.

Ayurveda explains hair (Kesha) from a broader systemic perspective. *Kesha* is considered *Asthi Dhatu Mala*, indicating that healthy hair reflects the normal metabolism of *Asthi Dhatu*. However, nourishment of hair primarily depends upon *Rasa Dhatu*, as nutrients are transported through *Rasavaha Srotas* before reaching successive *Dhatus*. Therefore, both adequate tissue nutrition and proper *Asthi Dhatu* metabolism are essential for maintaining healthy hair. This concept closely resembles the modern understanding that hair follicles require continuous vascular perfusion for oxygen, glucose, amino acids, trace elements, and growth factors.

According to *Ayurveda*, *Tridosha* collectively regulate hair physiology. *Kapha* provides nourishment, lubrication, and stability through its *Snigdha* and *Sthira* properties, which can be correlated with sebaceous gland function and maintenance of the scalp barrier. Pitta governs pigmentation and follicular metabolism through *Bhrajaka Pitta*, explaining why *Pitta* aggravation is commonly associated with premature graying and inflammatory scalp disorders. *Vata*, particularly *Vyana Vata*, regulates circulation, cellular communication, nutrient transport, and tissue development. Excessive *Vata* causes *Rukshata* (dryness), follicular degeneration, and *Kesha Patana*. Thus, hair disorders are usually manifestations of disturbed *Dosha* balance rather than isolated scalp pathology.

Among various *Ayurvedic* interventions, *Panchakarma* and *Murdhni Taila* procedures occupy a unique place because they not only alleviate vitiated *Doshas* but also improve local scalp physiology. Their effects can be understood through both classical *Ayurvedic* principles and modern biomedical mechanisms.

Role of *Nasya Karma*

Nasya Karma is one of the principal *Panchakarma* procedures indicated for diseases *Urdhvajatrugata Roga*. The nose is described as the "gateway to the head" (*Nasa Hi Shiraso Dwaram*). Administration of medicated oils or herbal preparations through the nasal cavity allows rapid interaction with the richly vascular nasal mucosa and extensive neural network supplied by the olfactory and trigeminal nerves.

From a physiological perspective, the nasal mucosa possesses abundant capillaries that facilitate rapid absorption of lipid-soluble herbal constituents into systemic circulation. Furthermore, the olfactory pathway provides a direct connection with the limbic system and hypothalamus, regions involved in autonomic regulation and neuroendocrine control. Activation of these pathways may improve cerebral and scalp blood circulation, enhance parasympathetic activity, reduce sympathetic overactivity, and decrease stress-induced cortisol secretion.

Improved scalp perfusion increases oxygen and nutrient delivery to dermal papilla cells, stimulates follicular metabolism, and supports prolonged anagen growth. Many medicated oils used for *Nasya* possess antioxidant, anti-inflammatory, and *Rasayana* properties that may protect follicular stem cells from oxidative damage. Thus, *Nasya* may be viewed as a neurovascular therapy that simultaneously modulates autonomic function and enhances follicular nutrition.

Role of *Shiroabhyanga*

Although Shiroabhyanga is classified under *Purva Karma***,** it is among the most widely practiced procedures for maintaining scalp and hair health. Mechanical massage of the scalp stimulates cutaneous mechanoreceptors, resulting in vasodilatation through axon reflexes and release of vasoactive neuropeptides.

Increased local blood flow enhances oxygenation of dermal papilla cells and improves delivery of amino acids, minerals, vitamins, and growth factors required for keratin synthesis. Massage also facilitates lymphatic drainage, thereby removing inflammatory mediators and metabolic waste products from perifollicular tissues.

Repeated scalp massage has been shown to influence the expression of genes associated with dermal papilla function and increase hair thickness. The gentle pressure applied during

Shiroabhyanga also stimulates parasympathetic activity, reduces cortisol levels, improves sleep quality, and decreases psychological stress, which is one of the common causes of telogen effluvium.

From the Ayurvedic perspective, medicated oils possessing *Snigdha, Guru, Madhura*, and *Vatahara* properties nourish the scalp tissues, pacify *Vata*, and promote proper functioning of *Asthi* and *Majja Dhatu.*

Role of Shirodhara

Shirodhara is a unique *Murdhni Taila* procedure in which a continuous stream of medicated liquid is poured over the forehead. The rhythmic flow produces constant tactile stimulation over the supraorbital region supplied by branches of the trigeminal nerve.

Continuous stimulation generates neurophysiological responses involving the hypothalamus, pituitary gland, limbic system, and autonomic nervous system. Studies have demonstrated reductions in heart rate, blood pressure, respiratory rate, serum cortisol, and sympathetic activity following *Shirodhara*.

Stress is now recognized as one of the major contributors to hair loss through premature induction of the catagen phase. Elevated cortisol suppresses follicular stem-cell activity, promotes perifollicular inflammation, and accelerates telogen entry. By reducing stress hormones and improving autonomic balance, *Shirodhara* creates a favorable hormonal environment for maintenance of the anagen phase.

The procedure may also increase cerebral blood flow and enhance secretion of serotonin and melatonin, thereby improving sleep quality and emotional well-being. Consequently, its role extends beyond local scalp therapy to systemic neuroendocrine modulation.

Role of *Shiro Pichu*

Shiro Pichu involves placing cotton soaked in medicated oil over the scalp for a prolonged duration. Continuous contact allows gradual diffusion of lipid-soluble phytochemicals through hair follicles and sebaceous ducts, which serve as important pathways for transdermal absorption.

The prolonged oleation provides sustained hydration of the scalp, restores the lipid barrier, reduces transepidermal water loss, and nourishes hair follicles. Medicated oils containing

antioxidant herbs may reduce oxidative stress within follicular cells and protect against apoptosis induced by reactive oxygen species.

According to *Ayurveda*, prolonged *Snehana* pacifies *Vata*, improves tissue nourishment *Dhatu Poshana*, and strengthens hair roots.

Role of *Shiro Basti*

Shiro Basti provides prolonged retention of warm medicated oil over the scalp. Mild heat causes superficial vasodilatation and enhances penetration of herbal constituents into deeper tissues. Increased local circulation improves delivery of nutrients and oxygen to actively dividing matrix cells within the hair bulb.

Heat also increases enzymatic activity, accelerates local metabolism, and facilitates removal of inflammatory metabolites. The combined effects of *Snehana* and *Mridu Swedana* make *Shiro Basti* particularly useful in chronic *Vata* dominant scalp disorders associated with dryness, brittleness, and excessive hair fall.

From a neurophysiological perspective, warmth and sustained pressure produce profound muscle relaxation and parasympathetic dominance, reducing stress-mediated hair loss.

Role of *Shiro Lepa*

Application of medicated herbal paste over the scalp combines pharmacological and thermal actions. Evaporation of moisture initially produces cooling, followed by mild warming due to increased local circulation. Heat-induced vasodilatation improves tissue perfusion and increases permeability of superficial capillaries.

Herbal constituents possessing anti-inflammatory, antioxidant, antimicrobial, and Rasayana properties directly act upon scalp tissues. Enhanced blood flow facilitates removal of inflammatory mediators and promotes regeneration of damaged follicles. In *Ayurvedic* terms, this may be interpreted as *Srotoshodhana***,** *Kapha Meda Shamana*, and local *Rasayana* action.

Role of *Raktamokshana* (*Jalaukavacharana* and *Prachanna*)

Among *Panchakarma* procedures, *Raktamokshana* is particularly valuable in disorders involving *Rakta Dushti* and *Pitta* predominance. Chronic perifollicular inflammation, microvascular congestion, and oxidative stress are important mechanisms contributing to many forms of hair loss.

Jalaukavacharana (leech therapy) removes vitiated blood while simultaneously delivering biologically active substances such as hirudin, calin, and vasodilatory peptides. These substances improve microcirculation, inhibit platelet aggregation, reduce inflammation, and enhance oxygen delivery to tissues.

Prachanna (multiple superficial scarifications) produces controlled local bleeding, which stimulates angiogenesis, tissue repair, and release of growth factors. Improved vascularity around hair follicles creates a favorable environment for follicular regeneration.

From the *Ayurvedic* perspective, *Raktamokshana* removes vitiated *Rakta* and *Pitta*, clears obstructed *Srotas*, restores normal tissue perfusion, and promotes healthy hair growth.

CONCLUSION

Hair health reflects the overall physiological status of the body and depends upon proper interaction between nutrition, hormonal balance, vascular supply, neural regulation, and healthy hair follicles. Ayurveda provides a holistic understanding of *Kesha* by relating it to *Asthi Dhatu*, *Rasa Dhatu*, and *Tridosha.*

Ayurvedic procedures such as *Nasya Karma*, *Shiroabhyanga*, *Shirodhara*, *Shiro Pichu*, *Shiro Basti*, *Shiro Lepa*, and *Raktamokshana* possess strong theoretical and physiological bases for promoting scalp health and maintaining normal hair growth. Their beneficial effects can be explained through improved microcirculation, enhanced follicular nourishment, autonomic regulation, stress reduction, and modulation of inflammatory pathways.

Future clinical studies employing objective biomarkers, dermoscopy, trichoscopy, and molecular techniques are required to scientifically validate these traditional procedures. Integration of *Ayurvedic* principles with modern hair biology may offer safe, holistic, and effective strategies for preventing and managing hair disorders.

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