

Efficacy of Ayurvedic herbal gel in the management of Dandruff: A case study

Case Report

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Abstract

Dandruff (*Darunak*) is the common skin disease affecting the scalp area with the presence of itching, hair fall, dryness of scalp and dander. It is affecting the half of the adult population of either gender worldwide. Even though the prevalence is so high, its etiology being varied the treatment modalities are also different. Although dandruff is not among those disease to cause severe illness or morbidity, but it has a lot of social concern which reflects individual's confidence and self-esteem. This paper aims to present clinical case study presentation with diagnosis using advance technique of Trichoscopy and the management of dandruff with the topical application of *Dashemani Kandughna* gel which showed excellent results.

Key Words: *Dandruff (Darunak), Dashemani Kandughna Gel, Trichoscopy.*

Introduction

Health and beauty are collegial with each other; wherein the body mind equilibrium includes balanced digestion, proper tissue formation along with maintenance of skin-hair in normal conditions(1). Maintenance of healthy hair and prevention of the diseases of the scalp, taking care of scalp becomes vital. Every human being desires to remain free from hair problems and keen for healthy hair with healthy scalp.

However due to imbalanced diet, environmental pollutants and improper hair care, individual's scalp may get affected. Dandruff is a scalp disorder which is characterized by excessive shedding of skin cells, itchy-flaky skin and invisible inflammation. Human beings are more prone for occurrence of dandruff at puberty to middle age(2). Dandruff medically described as Pityriasis capitis caused by *Malassezia* species(3) which is lipophilic, dimorphic opportunistic yeast causing skin and hair infections(4). Another microorganism community composed of bacteria also inhabits the human scalp and includes facultative anaerobic bacteria, such as *Propionibacterium acnes* and aerobic bacteria, such as *Staphylococcus* (3,4).

Ayurvedic literature reveals that avoidance of oil application and improper cleaning of scalp, sleeping in day time, night vigil, exposure to dust, hot weather are the causative factors for development of dandruff. It is a *Vata-kaphaj* predominant disease of scalp and produces specific symptoms which are correlated with modern literature of dandruff(5). Moreover it is stated that approximately 50% adult population is affected by dandruff worldwide while the 18.38% Indian community is affected by this disorder(6). To combat with occurrence of dandruff and associated symptoms, various antidandruff agents having chemical entities in the form of shampoos, gels, creams etc are utilized in existing current practice. Though these agents have therapeutic potential to treat dandruff like disorders but might be having risk to produce untoward effects to human scalp and hair. Thus innovative dosage form "*Dashemani Kandughna* gel" is taken as a trial drug. As *Dashemani Kandughna mahakashaya* is mentioned in the *ayurvedic* classics(7) is converted into gel form for the ease of the application which is herbal and considerably safe and effective in the management of dandruff.

Case Study

A 32 year old female presenting with chief complaints of Itching of scalp (*Kandu*), Hair fall (*Keshchyuti*) with the presence of Dandruff since 1.6 years. Clinical examination revealed Dryness (*Rukshata*) and scaling of scalp skin (*Twakspatan*). Patient was complaining about white flakes fall off from the scalp skin which caused social embarrassment to her.

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No specific past illness and family history present. Patient had *Vata*kaphajprakruti as analyzed by questionnaires of *PrakrutiParikshan*. After history taking it was observed that patient was consuming mixed diet with more sour (*Amla*), salt (*lavan*) and Pungent (*Katu rasa*) food. *Koshtha* was *Krura* and irregular bowel habit with feeling of incomplete evacuation. *Mutravrutti* was 5-6 times /day with normal appearance. Sleeping pattern was disturbed as of 4-5 hours, *Sparsh* (Touch) was rough and cold. *Nadi* (Pulse) was 82/min with *Kapha-Vatadoshapradhanya*. *Jivha* (Tongue) was coated. Hair was thick, dark brown in color with dry scalp. Hair wash frequency is weekly once by using chemical shampoos with application of conditioner. Combing habit was only once a day for 2-3 minutes i.e. improper combing. Patient was using chemical medicinal products also. She had been using blow dryer and temporary hair dyes. Scalp hygiene habits showed causative factors for Dandruff.

Ashtavidh Pariksha (8)

- *Nadi* (Pulse): 82/min, Regular, *Vata-Kaphapradhan*
- *Druk* (Eyes & Vision): Normal
- *Mala* (Fecal matter): *Krurakoshtha*, Irregular bowel habit with feeling of incomplete evacuation
- *Aakruti* (General Body Built): *Madhyam*
- *Mutra* (Urine): *Samyak*, 6-7 times/day
- *Sparsh* (Touch): *Ruksha* (Dry) , *Sheet* (Cold)
- *Shabd* (Voice of patient): Healthy Normal
- *Jivha* (Tongue): *Sam*

Nidan Panchak (9)

- *Hetu* (Causes): *Amla, Lavan, Katu rasa sevan*, Disturbed sleeping pattern, *Scalp hygiene habits*, *Combing habits*, Use of Chemical products, blow dryer and temporary dyes.
- *Roop* (Signs): Scalp Itching, Hair fall, White flakes falling off from scalp
- *Upshaya* (Examination Method): Scalp status was examined by subjective and objective parameters.

Subjective parameters included Itching (*Kandu*) - 03, Falling of Hair (*KeshaChyuti*) - 03, Dryness (*Rukshata*) - 03 and Scaling / cracking of skin (*Twaksputan*)-03.

0, 1, 2, 3 were the gradation according severity of symptoms(10).

Grade Severity

Itching (Kandu)

- 0 No itching
- 1 Mild, Tolerable (1 to 2 times a day)
- 2 Moderate , Intolerable (3 to 4 times a day)
- 3 Severe, Intolerable (5 to 8 times a day)

Falling of Hair (KeshaChyuti)

- 0 1 to 5 Hair fall on combing /washing
- 1 Mild ; Less than 20 Hair fall on combing /washing
- 2 Moderate; more than 20 hair fall on combing / washing
- 3 Severe ; Less than 20 hair fall on simple hand strength

Dryness (Rookshata)

- 0 No Dryness
- 1 Mild; Dryness with rough skin
- 2 Moderate; Dryness with scaling
- 3 Severe; Dryness with cracking skin

Scaling/ Cracking of skin (Twaksputan)

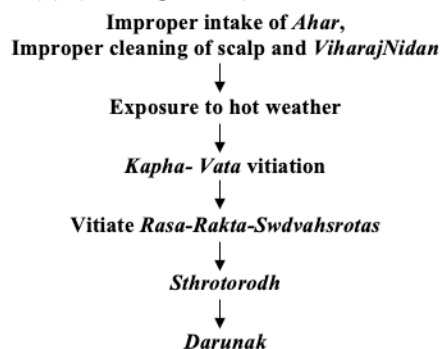
- 0 No scaling
- 1 Mild; Scaling 1/4th part usually on vertex
- 2 Moderate; Scaling is more than 1/2 part
- 3 Severe; complete Scaling

Objective parameters included Trichoscopy(11)

- 0 No scales
- 1 Thin scales
- 2 Diffused thin scales
- 3 Thick heaped-up scales but not forming plaques
- 4 Diffused thick heaped-up scales but not forming plaques
- 5 Very thick heaped-up scales forming plaques

Four zones on each patient’s scalp was pre-defined for assessment –Frontal, Right / left parietal, Right / Left Temporal, Occipital. Comb was used to part the hair in each area to give a clear view of the patient scalp. Each section of the scalp was assessed for the presence of dandruff flakes. 0 means no flakes and 5 means intense flaking.

Samprapti (5) (Pathogenesis):



Samprapti Ghatak (5)

- *Dosha*: *Kapha, Vata*
- *Dushya*: *Twak, Rakta*
- *Srotas*: *Swadvahsrotas*
- *Adhishthan* : *Kapal*(Scalp)
- *Vyaktisthan*: *Kapal*(Scalp)
- Differential diagnosis: *Seborrheic dermatitis*

Treatment

- *Dashemani Kandughna* gel - Topical application on scalp at night (*Nishakal*)(12)daily for 21 days.

In Ayurvedic classical text the application of Hair pack (*lepa*) formulation for treatment of Dandruff (*Darunak*) is stated, wherein 21 days application is recommended to get desired effect. Thus in present study *Dashemani Kandughna* Gel was topically applied for continuous 21 days with gentle massage on scalp skin. Skin protective barrier function is decreased during the night hours and there is more permeability. Thus, *Dashemani Kandughna* Gel was applied at nighttime for better absorption and better efficacy.

Preparation of Dashemani Kandughna Gel:

Table 1: Dashemani Kandughna Gel Ingredients

S. N.	Drug Name & Part Used	Latin name	Quantity	Action
1	Raktachanda Stem	<i>Pterocarpus santalinus</i> Linn. Family: Leguminosae	25 g	Antimicrobial to <i>Staphylococcus aureus</i> & <i>Pseudomonas aeruginosa</i> (13)
2	Jatamansi Root	<i>Nordostachys jatamansi</i> DC Family: Valerianaceae	25 g	Inhibition to <i>Staphylococcus aureus</i> (14)
3	Aaraghwadh Leaves	<i>Cassia fistula</i> Linn. Family: Caesalpinioideae	25 g	Antimicrobial to <i>Staphylococcus aureus</i> & <i>staphylococcus epidermidis</i> (15)
4	Karanj Seed	<i>Pongamia pinnata</i> Pierre Family: Leguminosae	25 g	Antimicrobial activity to <i>Staphylococcus aureus</i> (16)
5	Nimb Leaves	<i>Azadiracta indica</i> .Juss Family: Meliaceae	25 g	Antiseptic, antifungal & Carminative action
6	Kutaj Bark	<i>Holarrhena antidysenterica</i> (Linn)Wall) Family: Apocynaceae	25 g	Antimicrobial action against <i>Pseudomonas aurengosa</i> (17)
7	Sarshap Seed	<i>Brassica campestris</i> Linn. Var.Sarson Prain Family Cruciferae	25 g	Vermifuge,cures skin eruptions & itching (18)
8	Yashtimadhu stem	<i>Glycerrhiza glabra</i> Linn. Family: Leguminosae	25 g	Anti-micotic action against <i>Candida</i> (19)
9	Daruharidra Stem	<i>Berberis aristata</i> DC Family: Berberidaceae	25 g	Antibacterial to <i>Staphylococcus aureus</i> , anti-helminthic and leishmanicidal properties (20)
10	Musta Rhizome	<i>Cyperus rotundus</i> Linn Family: Cyperaceae	25 g	Antibacterial & antifungal action(21)
11	Carbopol 934	Carbomer	10 g	Gelling agent(22)
12	Triethaloamine		q.s.	pH adjuster (22)
13	Glycerol		30 g	Humectants
14	DMDM (1,2 Dimethylol-5,5 dimethylhyda ntoine)		6 g	Preservative (23)

Authentication and identification of herbal drugs were conducted at Agharkar research institute Pune . All herbal drugs were subjected to various physico-chemical tests as per API. Analytical reagents grade gelling agent, pH adjuster and preservative were taken.

Dashemani Kandughna gel was prepared by standard method of gel preparation

Preparation of Dashemani Kandughna gana coarse powder:

All the drugs of *Dashemani Kandughna gana* each 25 g were taken in dry form.They all were minced in pulveriser one by one with 36 number sieve to get coarse powder and then all powders blend in hexagonal mass mixture machine to get homogeneous mixture.

Preparation of *Dashemani Kandughna gana* decoction (24):

One part(250 g) *Dashemani Kandughna gana* coarse powder was taken in stainless steel vessel. Sixteen times(4000 ml) water was added in it and it was heated at medium flame till its 1/4th part (1000 ml) was remained. Then it was filtered with muslin cloth to acquire decoction.

Preparation of *Dashemani Kandughna gel*(25):

Dashemani Kandughna decoction(1000 ml)of normal temperature was taken. Then added Carbopol 934P of 1% concentration(10 g) with the addition of

Glycerol (30 g) & DMDM (6 g). The mixture was kept for 6-7 hours to allow the dispersion of Carbopol. After that with the aid of overhead mechanical stirrer, make a homogeneous mixture with 1200 rpm to form gel aspect. Obtained homogeneous mixture was neutralized with required quantity of Triethanolamine drop by drop with continuous stirring until it gets converted into perfect desired gel and pH.

Physico-analytical testing

This prepared gel was analysed as follows:

- Colour-Yellowish Brown,
- Odor -Pleasant,
- State- Semisolid,
- Visual appearance- Translucent and Transparent,
- Homogeneity- Consistent,
- pH- 6.98,
- Viscosity at 20 rpm 34,500, at 100 rpm- 9450,
- Spreadability- Easily Spreadable,
- Irritancy test- No Redness, No oedema, No inflammation and Irritation during Irritancy test,
- TLC- Tannin-0.47, Flavonoides-0.84 and Saponins-0.64.

Material and Methods

Homogeneity (26)

Gel was tested by pressing a small amount of gel between the index finger and thumb. The gel's consistency, presence of coarse particles, if any, was used to evaluate the texture and homogeneity of gel.

pH determination (26)

pH of Gel was performed by using Digital pH meter previously calibrated before each use with standard buffer solutions.

Viscosity (27)

Viscosity of gel was determined by using Brookfield Viscometer at 20 RPM and at 100 RPM DV-II+Pro with T bar spindle and Helipath adjustment. The suitable T bar spindle was selected to obtain torque value between 10 to 100. The viscosity of gel displayed on screen at 25⁰C was recorded.

Spreadability (28)

Both glass slides of apparatus were cleaned with alcohol and allowed to dry. 1g of gel was placed between the two glass slides. Then 100g of weight was placed on top slide for 5 minutes to compress the sample up to uniform thickness. Initial weight (100g) was added in the pan. The weight in the pan was increased until the upward slide starts to move over stationary slide. The time in seconds(s) require to separate the two slides was noted. The triplicate of each sample was taken and time required and distance travelled by slide was noted.

Irritancy test(29)

Mark an area of one square cm on the left hand dorsal surface. The Sample gel was applied to the specified area and time was noted. Irritancy, erythema, oedema was checked, if any, for regular intervals up to 24 hours and reported.

Thin Layer Chromatography(30)

1.0001 g of gel was taken & dissolved in 10ml of methanol. (1% solution). After the preparation of mobile phase & test solution TLC plate (TLC silica Gel 60F 254) were taken. Then 1 drop added at the downward center of TLC plate with the help of capillary tube. Measure the distance of 2cm from downward. Then TLC plate kept in TLC chamber until solution is running at ¼th portion. After running the solution, TLC Plate was taken out of the chamber. TLC plate was allowed to air dry. The air dried plate was placed in UV cabinet at 365nm (make – Biotechnics India, ID No. 71649). Then Purple colored observed for Tannis, R_f Calculated. Same method shall be applicable for Saponins and Flavonoids. Mobile phase for Saponins-Chloroform: Methanol: Water (70:30:4) Mobile phase for Flavonoides: Chloroform: Ethyl Acetate (60:40) and for Tannin Chloroform: Methanol: Acetic Acid (18:1:1).

Results

After the 7th, 14th and 22nd day of assessment, variations in results were found on each symptom associated with Dandruff (*Darunak*). Patients got relief in sign and symptoms with gradual improvement. Assessment on each symptom of Dandruff and Trichoscopy examination have been presented in Table no.1 and 2.

Table 1: Showing result of the treatment

Sr No	Symptoms	Before Treatment	After Treatment		
			7th Day	14th Day	22nd Day
1	Itching	3	1	1	0
2	Falling of Hair	3	2	2	1
3	Dryness	3	2	1	0
4	Scaling / Cracking of skin	3	2	1	0
5	Other symptoms if any				
	A. Irritation B. Inflammation C. Redness D. Exaggerated symptoms of scalp		No any	No any	No any

Table 2: Trichoscopy Report

Trichoscopy Finding Grade	Before Treatment	After Treatment
	5	1

Before Treatment: Trichoscopy of four zones

Figure 1 Frontal	Figure 2 Right parietal/ temporal	Figure 3 Left parietal/ temporal	Figure 4 Occipital

After Treatment: Trichoscopy of four zones

Figure 5 Frontal	Figure 6 Right parietal/ temporal	Figure 7 Left parietal/ temporal	Figure 8 Occipital

Discussion

Darunak can be corelate with Dandruff which is a common scalp disorder, characterized by presence of corneocytes that form clusters due to their high cohesive power, in the form of flaky white to yellowish scales with dryness of scalp, accompanied by itching and hair fall(31). Stringent ayurvedic literature review revealed that there are different diseased condition stated under *Kshudrarog* or *Shirorogadhikar*(32). Causing factors for *darunak* are intake of improper *Aharadravya*, improper cleaning of scalp and *Viharajnidan* like *Rajahasavana* (Exposure to dust), *Atapaathisevana* (Exposure to hot weather). Due to this *Kapha, Vata* vitiation occurs which further vitiates *Rasa-Raktadhatu* resulting in vitiation of *Rasa- Rakta-Svedavahastrotus*. It is subsequent the *strotorodha* ensuing the *Darunak* (Dandruff)(5). Microorganisms like *Malassezia species*, *Propionibacterium* and *Staphylococcus* are also causing factors of Dandruff (3,4).

Thus considering this guideline of ayurvedic classical text, in the present study *Dashemani kandughna* gel encloses herbal drugs viz *Raktachandan*, *Jatamansi*, *Araghwadh*, *Naktamal*(*Karanj*), *Nimb*, *Kutaj*, *Sarshap*, *Yashtimadhu*, *Daruharidra* and *Musta* are selected as all these drugs possesses anti-Itching (*Kandughna*), antibacterial (*Krumighna*), reduce inflammation (*Shothghna*), Wound healing (*Vranaropan*) and antimicrobial (*Kushtghna*) action(33).

It is observed that all drugs are useful in skin related problems with symptoms of itching, infection, inflammation and pain. Cumulative action in combination of ten herbal drugs of *Dashemani Kandughna* gel showed excellent results on pacifying the vitiated *Dosha-Dushya* affecting the scalp skin reduces dandruff. All these herbal drugs are advised to treat *Kandu* (Itching) like symptom occurred due to certain changes in physiological conditions(7). In earlier research work it is also reported that stem of *Raktachandan* has antimicrobial activity to *Staphylococcus aureus* and *Pseudomonas aeruginosa* (13), root of *Jatamansi* showed significant inhibition to *Staphylococcus aureus*(14), *Araghwadh* leaves having antimicrobial activity to *Staphylococcus aureus* and *Staphylococcus epidermis*(15), the seeds of *Karanj* comprise antibacterial (*Staphylococcus aureus*) activity(16), leaves of *Nimb* has antiseptic, antifungal and carminative actions as well as *Sarshap* is effective as vermifuge(17), to cure skin eruption and itching. *Kutaj* bark has antimicrobial activity against *Pseudomonas aeruginosa*(18), *Yashtimadhu* has reported ant micotic activity against *Candida albicans* (19). *Daruharidra* possesses antibacterial, antihelminthic and leishmanicidal activity as against *Candida albicans* and considered as anthelmintic to cure skin rashes and wounds (20). Thus synergism of all these ten herbal drugs showed therapeutic potential to treat flaky, itchy skin as present in dandruff. *Dashemani Kandughna* gel helps to clean off the debris and prevent the scalp from secondary incursion of microbial growth by giving promising results.

Conclusion

Vata-Kaphaj predominance and microbial growth of specific species causes Dandruff. In this case report new innovative dosage form “*Dashemani kandughna* gel” was found safe and showed excellent results in the management of Dandruff. The treatment was focused to relieve the signs and symptoms of the disease, ameliorating the associated complains and maintaining the effect of the gel for a long term. The standardization and stability study of *Dashemani kandughna* gel was also conducted.

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