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Research Article

A CLINICAL STUDY ON THE EFFICACY OF *TRIPHALADI PRATISARANA* IN *KRUMIGRANTHI* (BLEPHARITIS)

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ABSTRACT

Blepharitis or inflammation of the eye lid is one of the most frequently encountered eyelid disorder. It is often a troublesome condition for patients owing to the long standing nature of disease and fluctuations in its severity. The chronic inflammation can cause the damage to occular surface ie to the conjunctiva and cornea because of the intimate relationship between the lids and ocular surface. Blepharitis, if not recognized and appropriately managed, can lead to worsening of signs and symptoms, changes in visual function, disrupted preocular tear film, structural changes in eyelash follicle resulting in trichiasis, madarosis, tylosis and a negative impact on quality of life of patients.

Complete disease elimination is rarely achieved with the modern line of management which include topical antibiotic and weak steroid ointment. Based on the site of pathology, clinical features and the sequale of the disease it can be well correlated with the *Sandhigata roga -'Krumigranthi'* wherein the '*Krumis'* will later invade to the inner structures of eye. *Pratisarana* is one of the treatment modality explained for the treatment of *Krumigranthi* in the classics. Thus an observational study has been conducted on patients (n=10) of Shalakya tantra OPD of SKAMC, Bangalore to evaluate the efficacy of *Triphaladi pratisarana* in the management of *Krumigranthi.* The present study has come out with promising results in the reduction of signs and symptoms of anterior blepharitis. However clinical trials on large sample with long duration of follow up is necessary to establish the efficacy of *Pratisarana* as a procedure of choice and to analyse the recurrence rate after treatment.

KEYWORDS: Blepharitis, *Krumigranthi, Pratisarana, Triphaladi choorna.*

INTRODUCTION

Blepharitis or inflammation of the eye lid is one of the most frequently encountered eyelid disorder. It is often a troublesome condition for patients owing to the long standing nature of disease and fluctuations in its severity with periods of exacerbations and remissions. The word originates from the Greek word "blepharos", which means "eyelid" and the Greek suffix "itis", which means inflammation.[1] Even though blepharitis is one of the most common disorders encountered in eye clinic, inadequate prevalence or incidence data exist. Some reports indicate that it is present in almost 47 percent of ophthalmic patients. [2]

The chronic inflammation can cause the damage to ocular surface ie to the conjunctiva and cornea because of the intimate relationship between the lids and ocular surface. Out of the two clinical forms of blepharitis ie the anterior and posterior blepharitis, the former is usually affected by staphylococcal species and/or seborrhoea. Anterior blepharitis affects the anterior portions of the lid margin, including the eyelashes. Even though the pathophysiology of blepharitis is poorly understood triad of possible mechanisms underlies anterior blepharitis: 1). direct bacterial infection of the lids 2). reaction to the presence of endotoxins and/or exotoxins produced by pathogenic bacteria and/or commensal lid flora 3). cell-mediated delayed hypersensitivity response to bacteria antigens. [3]

Blepharitis is often misdiagnosed because of co-morbidity with other ocular surface disease like dry eye disease and allergic conjunctivitis. Also blepharitis can coexist with various dermatologic conditions including rosacea, eczema and seborrheic dermatitis. Exogenous irritants and allergens may exacerbate both forms of blepharitis. Patients over the age of 18 are more likely to be affected, but the disease is also found in children. [4]

Blepharitis, if not recognized and appropriately managed, can lead to worsening of signs and symptoms, disrupted preocular tear film, discomfort, changes in visual function, structural changes in eyelash follicle resulting in misdirected eyelashes (trichiasis), loss of eye lashes (madarosis), scarring with irregularity of lid margin (tylosis) and a negative effect on patient's quality of life. [5] Common sequelae of

blepharitis include blepharoconjunctivitis, hordeolum and chalazion (styes).

Complete disease elimination is rarely achieved with the modern line of management which include topical antibiotic ointment like sodium fuscidic acid, bacitracin, chloramphenicol, kenalog etc. and topical weak steroid ointment like flurometholone. Lid hygiene and removal of cause is of great importance regardless of type of blepharitis.[6]

Based on the site of pathology, clinical features and the sequale of the disease it can be well correlated with the *Sandhigata roga -'Krumigranthi'*. There are description regarding the involvement of *'Krumis'* (micro organisms) in the pathogenesis of *Krumigranthi.*[7] Even as per the modern science the pathology of anterior blepharitis is predominantly associated with involvement of bacteria and recently the role of parasites like Demodex folliculorum has come into scene. The *Lakshanas* of *Krumigranthi* exactly correlates with symptoms of chronic blepharitis such as '*Kandu'*-itching, '*Usha'* –burning sensation, '*Puyasrava'* –mucoid discharge, '*Pakshmapota'* – scaling of eyelid. The descriptions like '*Apange va kaneene va*' closely simulates the angular blepharitis[8]. Even the involvement of ocular surface in chronic cases is explained as *'Charantyantarnayanam dushayanti'* i.e., the *Krumis* will later invade to the inner structures of eye and afflict the ocular surface.

Aims and Objectives

1. To evaluate the efficacy of '*Triphaldi yoga'* in the management *Krumigranthi.*
2. To assess the efficacy of '*Pratisarana'* in the management of *Krumigranthi.*

Materials and Methods

This observational clinical study has been approved by the institutional ethical committee of SKAMCH & RC Bangalore. Before the start of the study written consent was taken from each patient willing to participate. Patients were free to withdraw their name from the study at any time without giving for any reason thereof.

The diagnosis of '*Krumigranthi*' – blepharitis was done on both the modern and Ayurvedic basis. For this purpose a special research proforma was prepared as per the modern and Ayurvedic view. The documentation has been made regarding history of the present complaint, past ocular history, present and past medication history. The detailed ocular examination has been performed using slit lamp biomicroscopy. Schirmer's test was also conducted to rule out the dry eye in suspected cases. Routine blood investigations, fasting blood sugar, serum cholesterol and routine urine investigations were done to rule out any systemic diseases.

(i) About the medicaments

The formulation selected for the *Pratisarana* is mentioned under *Krumigranthi chikitsa* in *Uttarastana* of *Ashtanga Hrudaya*[9]. The ingredients of *Pratisarana choorna* includes *Triphala, Kshaudra, Kaseesa* and *Saindhava*. The *Triphala choorna* manufactured by Pentacare Ayurpharma Bangalore has been used for present study. The *Kaseesa* and *Saindhava* have been procured from Ayurvedic raw drug distributors and the same has been identified and authenticated by the Dept of Rasashastra, SKAMCH & RC, Bangalore. The *Kaseesa* is subjected to *Shodhana* before usage based on the method in Ayurvedic Formulary of India (AFI)[10]. The honey manufactured by Dabur India Pvt Ltd was used for mixing the *Pratisarana choorna* before application.

Table 1: Ingredients and quantity of *Triphaladi yoga*

Ingredient	Quantity
Triphala choorna	10gm
Saindhava	1pinch
Kaseesa	1 pinch
Kshaudra	Q. S

Preparation of the medicine

All the ingredients are finely powdered and mixed thoroughly to get a uniform mixture. For each *Pratisarana* drugs have been taken in the following ratio(Table1):

The fine powder of *Triphala*, *Saindhava* and *Kaseesa* were mixed in a sterile vessel with the sufficient quantity of honey to get a thick mixture.

(ii) About the procedure – '*Pratisarana*'

Procedure

The patient is made to sit in a comfortable chair and asked to wear the mask before the treatment. The thick paste of *Pratisarana choorna* was taken in a clean and sterile vessel. The medicine was then applied over the eye lid margin and rubbed thoroughly to reach the entire lid. The procedure was done for a duration of 5-10 min and repeated for the other eye also. Care has been taken to prevent the entry of medicine into the eye while application and rubbing. The same procedure is then repeated over the lower eye lid also. After the procedure the lid was cleaned using cotton dipped in *Triphala kashaya*.

Study design

Open label clinical trial was conducted on 10 patients fulfilling the criteria for the diagnosis of the disease '*Krumigranthi*' -Blepharitis in the present study. The patients were selected from the outpatient department of *Shalakya Tantra* of Shri Kalabyraveshwara Ayurveda Medical College Hospital and Research Centre Bangalore.

Selection of patients

10 patients of age group 10-60 years were selected based on the inclusion and exclusion criteria (Table 2).

Table 2: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
The patients of age 10-60 years were selected irrespective of sex, occupation, religion and socioeconomic status.	Systemic diseases, such as diabetes, hypertension as well as autoimmune diseases including systemic lupus erythematosus, rheumatoid arthritis, thyroid disease, sarcoidosis, Sjögren's, and psoriasis.
Patients presenting with *Lakshanas* of *Krumigranthi* & signs and symptoms of anterior blepharitis	Patients under medications like beta blockers, diuretics, antihistamines, decongestants, chemotherapy medications, antidepressants, antipsychotic medications, hormonal anti contraceptives as well as hormone replacement therapy given to post menopausal women
Patients fit for *Pratisarana*	Associated with other ocular diseases like Dry eye, Computer vision syndrome, Allergic conjunctivitis.
Blepharitis of recent onset not more than a year.	Blepharitis with complications like blepharoconjunctivitis, hordeolum, trichiasis, tylosis, and chalazion.

Intervention

The study was intervened by the treatment - *Pratisarana with triphaladi yoga*. The patients were advised to follow the measures to maintain lid hygiene as per the protocol.

Treatment phase

Once daily for 5-10 minutes in each eyelid for 7days.

Follow up phase

One follow up has been conducted after 7 days of completion of treatment.

Total duration of study

Total duration of the study was 14 days.

Criteria for Assessment

Assessment of the effect of treatment on signs and symptoms have been done based on subjective and objective parameters by adapting a grading pattern before and after the treatment as follows: (Table 3 & Table 4).

Table 3: Grading of subjective parameters

Subjective Parameter	0	1	2	3
Itching of eyelids	No itching	Occasional tickle sensation not requiring to rub eye	Intermittent itching sensation which requires rubbing of eyes	Intolerable itching which would require significant eye rubbing
Burning sensation	No burning sensation	Occasional burning sensation	Frequent burning sensation	Continous burning sensation
Soreness	No soreness	Mild soreness	Moderate soreness	Severe soreness
Lacrimation	No lacrimation	Mild lacrimation (only on straining and exposure to light)	Moderate lacrimation which needs occasional mopping	Profuse lacrimation which needs continuous mopping

Table 4: Grading of objective parameters

Objective parameter	0	1	2	3
Photophobia	No photophobia	Mild photophobia on exposure to very bright light	Moderate photophobia on exposure to torch light	Severe disabling photophobia experienced even in daylight
Falling of eyelashes	No falling of eyelashes	Mild falling of eye lashes especially on rubbing	Moderate falling of eye lashes with diffuse loss of density of hair	Marked loss of eye lashes with wide gaping between the lashes
Hyperaemia of lid margin	No hyperaemia	Mild hyperaemia, visible on slit lamp examination	Moderate hyperaemia, visible on torch light examination	Severe hyperaemia, visibly evident on direct inspection
Scaling	No scaling	Mild scaling, visible on slit lamp examination	Moderate scaling, visible on torch light examination	Severe scaling visibly evident on direct inspection
Lid oedema	No lid oedema	Mild lid oedema	Moderate lid oedema	Severe lid oedema

Observation and result

Out of all 10 subjects enrolled for the present study 60% were male and 40% were female. 50% belongs to middle class, 40% to lower class and 10% to higher class. 50% of them were having secondary education and 30% were having primary education. In terms of chronicity, 40% were having a chronicity of 9months and 30% with 6months chronicity. (Table 5)

Table 5: Demographic data

Variables	Age Groups						Total
		10-20	21-30	31-40	41-50	51-60	
Gender	Male	2(20%)	0(0%)	1(10%)	1(10%)	2(20%)	6(60%)
	Female	0(0%)	1(10%)	0(0%)	1(10%)	2(20%)	4(40%)
Socio-economic status	Lower class	2(20%)	0(0%)	1(10%)	0(0%)	1(10%)	4(40%)
	Middle class	0(0%)	1(10%)	0(0%)	1(10%)	3(30%)	5(50%)
	Higher class	0(0%)	0(0%)	0(0%)	1(10%)	0(0%)	1(10%)
Educational status	Primary	1(10%)	0(0%)	0(0%)	0(0%)	2(20%)	3(30%)
	Secondary	1(10%)	0(0%)	0(0%)	2(20%)	2(20%)	5(50%)
	Higher secondary	0(0%)	0(0%)	1(10%)	0(0%)	0(0%)	1(10%)
	Graduation	0(0%)	1(10%)	0(0%)	0(0%)	0(0%)	1(10%)
Chronicity	<3months	1(10%)	0(0%)	0(0%)	0(0%)	0(0%)	1(10%)
	<6months	1(10%)	0(0%)	0(0%)	0(0%)	2(20%)	3(30%)
	<9months	0(0%)	1(10%)	1(10%)	1(10%)	1(10%)	4(40%)
	<12months	0(0%)	0(0%)	0(0%)	1(10%)	1(10%)	2(20%)

It has been observed that, the symptoms like itching of eyelids with pre-treatment mean score 2. 4 has been improved to mean 0. 7. Burning sensation of eyelid has been reduced considerably from the pre to post treatment by 50%. But there was no much remarkable reduction in photophobia and falling of eye lashes between pre & post treatment. The soreness which was uncomfortable prior to treatment (mean=2.0) has resulted in extending comfort (mean=1.1). The lacrimation which was before treatment (mean=2.2) has resulted in considerable reduction (mean=1.5). Hyperaemia of lid margin and scaling were the symptoms presented by all the patients and there were apparent reduction in both these symptoms post treatment. Lid oedema which was before treatment (mean=2.6) reduced considerably (mean=1.2) On applying statistical test before and after the treatment, symptoms like itching, burning sensation, soreness, hyperaemia of lid margin, scaling and lid oedema have shown highly significant result ($p<0.001$), lacrimation has shown significant reduction ($p<0.01$) and Changes in photophobia was insignificant ($p>0.05$). (Table. 6)

Table 6: Statistical analysis Pre & Post Treatments

S. No.	Variables	n	BT (Mean)	AT (Mean)	SD	SE	't' value	P
1	Itching of eyelids	10	2. 4	0. 7	0. 67	0. 2	8. 056	<0. 001
2	Burning sensation	6	2. 5	1. 2	0. 48	0. 19	6. 751	<0. 001
3	soreness	7	2. 0	1. 1	0. 34	0. 12	6. 695	<0. 001
4	Lacrimation	6	2. 2	1. 5	0. 48	0. 20	3. 333	<0. 01
5	Photophobia	4	1. 5	1. 0	0. 50	0. 25	2. 000	>0. 05
6	Falling of eyelashes	9	2. 2	1. 8	0. 47	0. 15	2. 121	<0. 05
7	Hyperaemia of lid margin	10	2. 1	1. 4	0. 64	0. 20	3. 458	<0. 001
8	scaling	10	2. 2	1. 2	0. 63	0. 19	5. 025	<0. 001
9	Lid oedema	9	2. 6	1. 2	0. 50	0. 16	8. 674	<0. 001

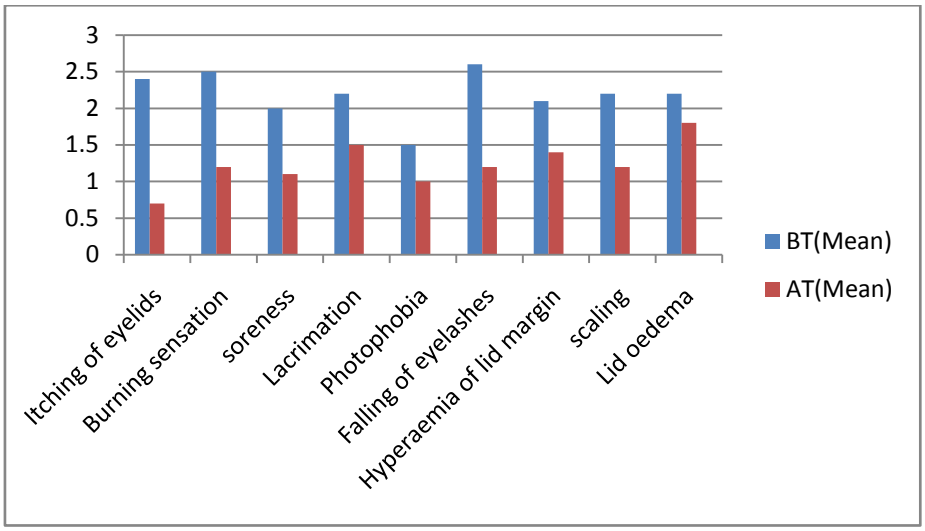

Figure 1: Observation Chart

DISCUSSION

'*Krumigranthi'* is explained as a *Sandhigata roga* both in *Ashtanga Hrudaya* and *Susruta Samhita. Acharya Susruta* considers it as a *Kaphaja vyadhi* while *Acharya Videha* describes it as a *Sannipataja vyadhi*. The *Samprapti* of the disease is well explained by *Acharya videha* as follows; the vitiated *Pitta* and *Kapha* forms *Granthi* on the *Vartma shukla sandhi* which later on due to *Ushma* undergoes *Pachana* and leads to manifestation of *Krumis*. These *Krumis* lodges in the *Pakshma* (eye lashes)and *Vartma* (eye lid) and vitiates eye.[11]

Bhedana is the treatment of choice explained for *Krumigranthi*. *Pratisarana* has to be performed after *Swedana* and *Bhedana* of the *Granthi*. The long standing cases of posterior blepharitis is generally associated with cystic dilatation of meibomian gland wherein *Bhedana* would be a treatment of choice. *Pratisarana* alone can be useful in anterior blepharitis where the meibomian cysts or abscess are rare to find out. There is no detailed description regarding the procedure of *Pratisarana* in the classics. The scattered references in the commentary of *Susruta samhia* explains the *Pratisarana* as a procedure of '*Avagharshana'* in which the medicine is rubbed or gently massaged against a base.

A)Action of *'Triphaladi yoga'*

Triphala is an extensively used formulation in various disorders due to its wide range of action. This renowned formulation is a combination of three fruits *Hareetaki* (*Terminalia chebula*), *Vibheetaki* (*Terminalia bellarica*) and *Amalaki* (*Emblica officinalis*) in equal proportions. In ancient Ayurvedic texts *Triphala* has been described as a *Rasayana* having *Tridosha hara* property. Due to its *Rooksha guna*, it has promising effect on *Srava* and *Kandu.* The *Kanduhara* property of *Triphala* is explained in *Hareeta Samhita*.[12] *Vibhitaki* is an excellent drug having *Kruminasana* property. The powder of *Triphala* is reported to have anti-inflammatory, anti-infective and immunomodulatory action. The immunomodulatory action of *Triphala* may help in correcting the cell-mediated delayed hypersensitivity response to bacteria antigens which is one of the postulated pathophysiology for blepharitis. The scientific studies on the aqueous extract of *Triphala* reported its efficacy as an antibacterial agent against staphylococcus aureus which is the main causative organism of blepharitis. [13] Recent extensive research indicates presence of different active compounds in them such as gallic acid, chebulagic acid, ellagic acid, flavonoids, tannins and phenols, which are responsible for its effective immune stimulatory action.

Kshuadra is having *Chakshushya, Tridoshashamana* and *Lekhana* property. It may facilitate the deeper penetration of the drug as it is having quality like *Sookshma marganusari.*[14] *Saindhava* due to its *Sookshma guna* facilitates the deeper penetration of the drug to the *Sookshma srotas*. It is having *Tridoshahara* and *Chakshushya* property.[15] *Kaseesa* is *Vatashleshmahara* and it possess *Ushna veerya*. It also holds *Netrya, Kanduhara* and *Vishahara* qualities.[16]

In short, the combination of the drug exhibits excellent *Tridosha hara*, *Kandu hara* and *krumihara* actions with deep penetrating property through minute channels. These properties accounts for the considerable reduction in itching, burning sensation, soreness, hyperaemia, scaling and lid oedema.

B) Probable mode of action of *'Pratisarana'*

'Pratisarana' means to rub or gently massage the medicine against a base. As the medicine is gently massaged or rubbed with tip of the finger into the skin of the eyelid there will be quicker and better absorption. The *Pratisarana* facilitates the quicker absorption of drug potency (*Veerya*) through *Romakoopa* (hair root), *Swedavahini*, (sweat gland) and *Siramukha* (vasculature). Hair follicle, sebaceous and sweat glands represent an important shunt route into the skin for topical drugs. The hair follicle infundibulum also has a large storage reservoir capacity, about 10 times more than the stratum corneum. Because of the pressure exerted on rubbing and the deep penetrating properties of the drugs in *Triphaladi yoga*, it can easily penetrate across the skin of eyelid through the appendageal roots.

The thickness and integrity of stratum corneum is an important factor determining the transdermal drug absorption. Thicker skin is a greater barrier to passage of the drug. The skin of eyelid is the thinnest in the body and it measures approximately 0. 05 cm. Because of its extreme thinness the medicine applied over the lid will penetrate deeper when rubbed on to skin.[17]

The basal layer of the epidermis of eyelid shows the presence of unicellular sebaceous glands and numerous typical eccrine sweat glands. The dermis is composed of rich network of elastic fibres, blood vessels, lymphatics and nerves. Percutaneous penetration of a drug occurs through the stratum corneum, underlying viable epidermis, dermis, and then finally into the circulatory and lymphatic system. Percutaneous penetration may occur through the intercellular, transcellular, and appendageal routes. The intercellular route is thought to have a major role in drug penetration, which involves partitioning of the drug into extracellular regions of the stratum corneum. The transcellular route involves the drug going through the corneocytes of the stratum corneum and the appendegeal route involves the drug entering the shunts of hair follicles and sebaceous and sweat glands, effectively bypassing the stratum corneum.[18]

By *Pratisarana* mechanical pressure is exerted on the eyelid margin which remove debris, bacteria, bacterial toxins, scales and crusts from the minute folds of the skin and thereby helps to maintain the lid hygiene. The rubbing of the drug will also improve the

vascular supply of the eyelid which in turn helps in faster and effective absorption.

CONCLUSION

Blepharitis represents the cutaneous disorder of the eye lid wherein the topical applications like *Pratisarana* have a great role to impart the clinical success in treatment. The present study carried out establishes the efficacy of *Pratisarana* in the management of blepharitis as the study has come out with promising results in the reduction of signs and symptoms of blepharitis. However clinical trials on large sample with long duration of follow up is necessary to establish the efficacy of *Pratisarana* as a procedure of choice and to analyse the recurrence rate after treatment.

REFERENCES

1. Rodolfo L. Rodriguez, O. D., Blepharitis Disease and Its Management, American optometric association, paraoptometric section, Available from: http://www.aoa.org/documents/optometricstaff/blepharitis_disease_and_its_management.pdf
2. Rodolfo L. Rodriguez, O. D., Blepharitis Disease and Its Management, American optometric association, paraoptometric section, Available from: http://www.aoa.org/documents/ optometricstaff/blepharitis_disease_and_its_management. pdf
3. A CME monograph-Blepharitis 2010 Update on research and management, July 2010, Available from: http://mededicus.com/downloads/ Blepharitis-Update-on-Research-and-Management. pdf
4. Rodolfo L. Rodriguez, O. D., Blepharitis Disease and Its Management, American optometric association, paraoptometric section, Available from: http://www. aoa. org/documents/ optometricstaff/blepharitis_disease_and_its_management.pdf
5. Ramanjit Sihota, Radhika Tandon, Parsons diseases of the eye, 21st edition, NewDelhi, Elsevier, 2011, pg. 442.
6. Charles H. May, Claud Worth, A Manual of Diseases of the eye, 5th Edition, London, Bailliere Tindall and Cox, 1927, pg.39.
7. Susrutha, Susrutha samhitha with Nibandha samgraha commentary by Dalhanaacharya, Chaukambha surabharati prakashan, Varanasi, Reprint 2012, Uttara Stana, chapter 2/9, p.g 599.
8. Vagbhata, AshtangaHrudaya with the commentaries of Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Chaukambha Sanskritsansthan, Varanasi, Reprint2009, Uttara Stana, Chapter 10/8, p. g 810.
9. Vagbhata, AshtangaHrudaya with the commentaries of Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Chaukambha Sanskritsansthan, Varanasi, Reprint2009, Uttara Stana, Chapter 11/6, p. g 812.
10. Ayurvedic formulary of india, Part-B, 2nd Edition The controller of publications, Civil lines, Delhi, 2001, pg. 21.
11. Prof. Udaya Shankar, Textbook of Shalakya Tantra, 1st Edition, Chaukhambha Visvabharati, Varanasi, 2012, pg. 231.
12. Bali Chauhan, Ramesh Chandra Kumawat, Mita Kotecha, Triphala –A Comprehensive ayurvedic review, International Journal of research in Ayurveda and pharmacy, 4(4), Jul-Aug 2013, pg 615.
13. Bali Chauhan, Ramesh Chandra Kumawat, Mita Kotecha, Triphala –A Comprehensive ayurvedic review, International Journal of research in Ayurveda and pharmacy, 4(4), Jul-Aug 2013, pg. 615.
14. Susrutha, Susruthasamhitha with Nibandhasamgraha commentary by Dalhanaacharya, Chaukambha surabharati prakashan, Varanasi, Reprint 2012, Sutra Stana, chapter 45/132, p.g207.
15. Vagbhata, AshtangaHrudaya with the commentaries of Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Chaukambha Sanskritsansthan, Varanasi, Reprint 2009, Sutra Stana, Chapter 6/143.
16. Dr. K. Ramachandra Reddy, Text book of Rasa sastra, 2nd Edition, Chaukhambha Sanskrit Bhawan, Varanasi, 2010, pg 260.
17. Sailesh Konda, Susan R. Meier-Davis, Brenda Cayme, Jutaro Shudo, Age related percutaneous penetration Part 1-Skin factors. Available from: http://www.ncbi.nlm.nih.gov/pubmed/ 22622279
18. Sailesh Konda, Susan R. Meier-Davis, Brenda Cayme, Jutaro Shudo, Age related percutaneous penetration Part 1-Skin factors. Available from: Available from: http://www.ncbi.nlm.nih.gov/pubmed/22622279

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