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A Comparative Clinical Study to evaluate the efficacy of *Tarpana* with *Mahatriphaladi Ghrita* and *Nasya* with *Abhijita Taila* in the management of *Timira* w.s.r. to Astigmatism

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ABSTRACT

Background: Astigmatism has the potential to influence normal visual development and its incidence has been increasing due to the excessive usage of display screens and decrease in nutritional values. 13% of the refractive errors of the eye include Astigmatism. In Ayurveda, Astigmatism can be related to *Prathama Patalagata Timira* based on its *Lakshanas*. **Methods:** 20 patients of Astigmatism in each group were selected from the OPD and IPD of the *Shalakya Tantra* department of SKAMCH, Bengaluru. Patients of Group A were given *Tarpana* with *Mahatriphaladi Ghrita* for 7 days and patients of group B were given *Nasya* with *Abhijita Taila* for 7 days. **Results:** Overall the effect of treatment was statistically highly significant for both *Tarpana* and *Nasya* on all the parameters. Within the group analysis on comparing the t- values, Group A has shown better results on all the parameters. Though both groups showed highly significant differences within the group analysis; in between the groups, effect of treatment on *Avyakta Darshana* and eye strain showed significant differences, visual acuity and dioptric value showed highly significant difference and non-significant difference on headache. **Interpretation and Conclusion:** The clinical study statistically proved that *Tarpana* with *Mahatriphaladi Ghrita* was more effective in comparison to *Nasya*. *Tarpana* provides increased tissue contact time and bioavailability of the medicines. By virtue of its procedural effect, medicines effect and the pressure exerted; it improves the visual acuity and dioptric power of the cornea.

Key words: *Timira; Astigmatism; Mahatriphaladi Ghrita; Abhijita Taila; Nasya; Tarpana.*

INTRODUCTION

Astigmatism is a type of refractive error wherein the refraction varies in different meridian of the eye eventually leading to blurring of vision. The asymmetrical surface of the cornea in astigmatism leads to blurred vision, difficulty in focusing of words and lines, eye strain and headache.

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Astigmatism is a common refractive error, which is about 13 per cent of the refractive errors of the human eye.[1] Astigmatism occurs when incident light rays do not converge at a single focal point. Normally, due to the uniform curvature of the entire surface of the cornea, it has same refractive power all over its surface. In some individuals, however, the cornea is not uniform and the curvature is greater in one meridian (plane) than another. Hence the light rays of such cornea will not fall on a single point focus resulting in blurred retinal images of both distant and near objects. These might appear as widened or elongated.[2]

In 1990 papers published from India highlighted the fact that uncorrected refractive error was a significant cause of blindness and the major cause of impaired vision.[3] If Astigmatism is left untreated it leads to Amblyopia, Squint eyes etc. In modern, only glasses or contact lenses are available and surgery can cure limited amount of which are highly expensive and complicated therapies.

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In Ayurveda, *Timira* indicates darkness and the conditions with gradual loss of vision leading to blindness are considered as *Timira*. Astigmatism can be compared with *Prathama Patalagata Timira* based on the *Lakshanas* i.e., *Avyakta Rupa Darshana*. If treatment is not given in time, the *Doshas* spread to fourth *Patala* and cause *Linganaasha* i.e., total blindness.

As *Krishnamandala* is predominant in *Vayu Mahabhuta*, so change in corneal curvature is seen due to vitiated *Vata* and *Snehana* is the best treatment to subside *Vata*.

Further *Tarpana* is the best topical treatment in pacifying *Vata Dosha* and at the same time it improves the *Drushti*. Also, *Chakradatta* has described *Abhijita Taila* for the management of *Timira* which restores the vision even in blind person.[4]

The present study was conducted to evaluate the efficacy of *Tarpana* with *Mahatriphaladi Ghrita* and *Nasya* with *Abhijita Taila* in the management of *Timira* w.s.r to Astigmatism.

Objectives of the Study

The present study was carried out with the following aims and objectives:

1. To evaluate the clinical efficacy of *Tarpana* with *Mahatriphaladi Ghrita* in *Timira* W.S.R. to Astigmatism.
2. To evaluate the clinical efficacy of *Nasya* with *Abhijit Taila* in *Timira* W.S.R. to Astigmatism.
3. To compare and evaluate clinical efficacy of both the groups.

Materials and Methods

A total of 40 patients of either gender approaching the OPD and IPD of Sri Kalabyraveshwara Ayurvedic Medical College Hospital and Research Centre, Bengaluru diagnosed as *Timira* w.s.r. Astigmatism were selected for this randomised, active, double arm, open label study. They were assigned into two groups i.e. Group A and Group B, each comprising minimum of 20 patients.

The sample collection was initiated with post approval from the Institutional Ethics Committee.

Diagnostic criteria

1. *Lakshanas* of *Prathama Patalagata Timira*.
2. Clinical features of Astigmatism.
3. Diminished visual acuity confirmed through Snellen's visual acuity chart for distant vision.

Inclusion criteria

1. Patients of either gender from 10-25years.
2. Patients able to read 6/9 of visual acuity or less than that.
3. Patients with the *Lakshanas* of *Prathama Patalagata Timira*.
4. Patients presenting with signs and symptoms of Astigmatism.
5. Patients of best corrected vision with cylindrical lens with dioptric value up to -2D.
6. *Nasya Arha*.
7. *Tarpana Arha.*

Exclusion criteria

1. Patients with the history of any systemic disorder that may interfere with the course of the study.
2. Patients with high myopia.
3. Astigmatism with any other ocular pathology.
4. Patients who have underwent any of the refractive surgery.

Intervention

The study was intervened in two phases

1. Treatment phase
2. Follow up phase

1. Treatment phase

Table 1: Showing treatment phase

Group	Procedure	Dose and duration
Group A	*Tarpana* with *Mahatriphaladi Ghrita* Time: in the morning	*700 Maatrakaala* 7 days

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Group B	*Nasya* with *Abhijita Taila* Time: in the morning	8 drops each nostril 7 days

2. Follow-up phase

One follow up was done after 7 days of completion of the treatment.

Study duration

The total duration of the study in both the groups was 15 days.

Method of preparation of medicaments required for the study

The medicines required for the study were

- *Abhijita Taila* for *Nasya*
- *Mahatriphaladi Ghrita* for *Tarpana*

Abhijita Taila

Table 2: Ingredients required for the preparation of *Abhijita Taila*

SN	Name	Quantity
1.	*Tila Taila*	500ml
2.	*Yashtimadhu Kalka*	125gms
3.	*Amalaki Swarasa*	2 and ½ ltr
4.	*Godugdha*	2 ltrs

Method of preparation

Pre-preparatory procedure

- All the necessary utensils and vessels required for the procedure were cleaned and kept ready.
- Preparation of *Yashtimadhu Kalka: Yashtimadhu Twak* was coarsely powdered and sufficient water was added to make *Kalka.*
- Preparation of *Amalaki Swarasa:* Fresh juice of *Amalaki Swarasa* was prepared using fresh *Amalaki* fruits.
- *Dugdha* and *Tila Taila* were transferred to clean vessels separately.

Procedure

- *Tila Taila* was heated on *Mandagni* to which *Amalaki Swarasa*, *Yashtimadhu Kalka* and *Dugdha* were added.
- The mixture was stirred intermittently so that it doesn't stick to the vessel.
- The mixture was kept standing overnight.
- Next day, the heating was continued till the mixture attained *Sneha Siddhi Lakshana* like *Gandha-Varna-Rasotpatti*, *Shabdahinata* (no cracking sound), *Phenodgama* (appearance of froth) and *Vartivat Kalka* (rolling of paste of herbal drugs between fingers).

Post procedure

- Once *Mrudu Paka* of *Taila* was attained, it was cooled down and filtered into a clean vessel and stored in airtight bottles.

Murchita Tila Taila and *Mahatriphaladi Ghrita*

In the present study, *Murchita Taila* was used for *Mukha Abhyanga* during *Nasya Karma.* And *Mahatriphaladi Ghrita* is used for *Tarpana. Mahatriphaladi Ghrita* was purchased from pentacare and dispensed from Sri Kalabyraveshwara Ayurvedic Medical College Hospital and Research Centre, Bengaluru.

Assessment criteria

Following were the subjective and objective parameters considered for the study.

Assessment Parameters

Subjective criteria

1. *Avyakta Darshana*
2. Eye strain
3. Headache
4. Visual acuity for distant vision using Snellen's chart.

Objective criteria

1. Clinical Refraction using autorefractometer and trial method.

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The assessment was done on,

BT - Before Treatment (Day 1)

AT - After Treatment (Day 8) and

AF - At Follow Up i.e., on 15th day.

The parameters considered for the study were scored for the purpose of statistical analysis.

Scoring Index

Table 3: Scoring index for *Avyakta Darshana* (blurring of vision for distant objects)

Score	Criteria
0	No blurriness in distant vision
1	Occasional blurring
2	Regular blurring without disturbing work
3	Regular blurring disturbing day to day work

Table 4: Scoring index for *Shirahshoola* (headache)

Score	Criteria
0	No headache
1	Occasional mild headache on straining of eyes
2	Moderate headache on straining of eyes which inhibits work
3	Headache persists even after relieving from work

Table 5: Scoring index for *Netrayasa* (eye strain)

Score	Criteria
0	No eye strain
1	>4 hours of distant and near work
2	<4 hours of distant and near work
3	<2hrs of distant and near work

Table 6: Scoring index for Visual acuity for both eyes

Criteria
6/6
6/9
6/12
6/18
6/24
6/36
6/60

Table 7: Scoring index for Dioptric value for both eyes

Criteria
0
-0.25D
-0.5D
-0.75D
-1D
-1.25D
-1.5D
-1.75D
-2D

Statistical Analysis

- For the statistical analysis the data obtained in both the groups were recorded, presented in tabulations and drawings.
- The Statistic Mean, Standard Deviation (SD), Standard error of Mean (SEM) and Standard Error of difference between two means (SE) were employed for descriptive statistics.
- To infer the clinical study and draw conclusion, students paired 't' - test was applied for within the group analysis and unpaired 't' - test was applied for between the group analysis.

OBSERVATIONS

Table 8: Observation on the different parameters

Parameters	Category	Value	%
Age	10-15	20	50%

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	16-20	07	17.5%
	21-25	13	32.5%
Gender	Male	20	50%
	Female	20	50%
Educational Status	School dropout	2	5%
	Below graduation	36	90%
	Graduate	2	5%
Occupation	Students	38	95%
	Others	2	5%
Family History	Present	16	40%
	Absent	24	60%
Chronicity	≤ 6months	13	32.5%
	>6months≤12 months	5	12.5%
	>12≤18months	6	15%
	>18≤24months	4	10%
	>24months	12	30%
Nidana	*Atiyoga* of *Indriya*	23	57.5%
	Sookshma Nireekshana	14	35%
	Doorekshanat	20	50%
Lakshanas	*Avyakta Darshana*	40	100%
	Eyestrain	17	42.5%
	Headache	21	52.5%
Visual Acuity	6/9	7	8.75%
	6/12	17	21.25%
	6/18	14	17.5%
	6/24	13	16.25%
	6/36	17	21.25%
	6/60	12	15%
Dioptric Value	-0.25D	1	1.25%
	-0.5D	22	27.5%
	-0.75D	11	13.75%
	-1D	16	20%
	-1.25D	5	6.25%
	-1.5D	11	13.75%
	-1.75D	9	11.25%
	-2D	5	6.25%

RESULTS

Table 9: Effect of treatment on symptoms within group A

Group A		Mean Diff	SD	SE	t-Value	P- Value	Re
Avyakta Darshana	BT-AT	1.2	0.52	0.11	10.25	<0.001	HS
	BT-AF	1.25	0.55	0.12	10.16	<0.001	HS
Eye Strain	BT-AT	1.28	0.48	O.18	6.96	<0.001	HS
	BT-AF	1.28	0.48	0.18	6.99	<0.001	HS
Head Ache	BT-AT	1.27	0.46	0.14	9.03	<0.001	HS
	BT-AF	1.27	0.46	0.14	9.03	<0.001	HS
Visual acuity	BT-AT	0.19	0.13	0.02	9.37	P<0.001	HS
	BT-AF	0.25	0.14	0.02	11.03	P<0.001	HS

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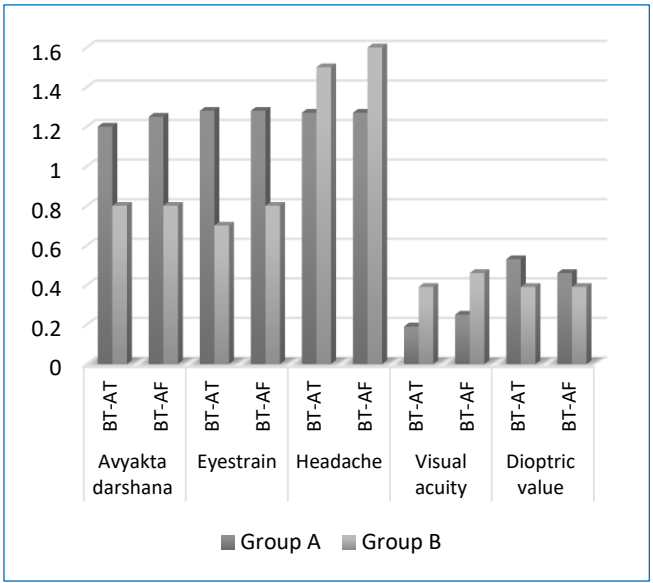
Dioptric value	BT-AT	0.53	0.30	0.04	11.23	P<0.001	HS
	BT-AF	0.46	0.31	0.04	9.5	P<0.001	HS

Table 10: Effect of treatment within group B

Group B		Mean Diff	SD	SE	t-Value	P- Value	Re
Avyakta Darshana	BT-AT	0.8	0.61	0.13	5.81	<0.001	HS
	BT-AF	0.85	0.61	0.13	5.83	<0.001	HS
Eye strain	BT-AT	0.7	0.48	0.15	4.58	<0.001	HS
	BT-AF	0.8	0.42	0.13	5.99	<0.001	HS
Headache	BT-AT	1.5	0.70	0.22	6.70	<0.001	HS
	BT-AF	1.6	0.69	0.22	7.23	<0.001	HS
Visual Acuity	BT-AT	0.17	0.16	0.02	6.68	<0.001	HS
	BT-AF	0.20	0.16	0.02	7.8	<0.001	HS
Dioptric Value	BT-AT	0.39	0.30	0.04	8.18	P<0.001	HS
	BT-AF	0.36	0.26	0.04	8.66	P<0.001	HS

Table 11: Effect of treatment on symptoms in between the groups

In B/W Group		PSE	t- Value	P-Value	Re
Avyakta Darshana	BT-AT	0.178	2.24	<0.05	S
	BT-AF	0.184	2.44	<0.05	S
Eye strain	BT-AT	0.23	2.54	<0.05	S
	BT-AF	0.21	2.24	<0.05	S
Headache	BT-AT	0.24	0.94	>0.05	NS
	BT-AF	0.22	1.48	>0.05	NS
Visual acuity	BT-AT	0.07	19.63	<0.001	HS
	BT-AF	0.07	24.09	<0.001	HS
Dioptric value	BT-AT	0.04	3.59	<0.001	HS
	BT-AF	0.04	2.65	<0.001	HS



Graph 1: Effect of treatment in between the groups

DISCUSSION

Astigmatism is a condition in which the refraction differs in different meridians of the eye which results in blurred vision. It occurs as a result of abnormalities of curvature of cornea.[5] *Avyakta Darshana* is the cardinal feature of *Prathama Patalagata Timira*. *Prathama Patala* is *Tejo Jala Ashrita* which represents *Tejas* of *Alochaka Pitta* and *Rasa Dhatu* respectively.[6] This *Alochaka Teja Samashraya* is seen in *Jala* which helps in *Preenana* i.e., by providing nutrition and nourishment to all the avascular structures. Cornea being an avascular structure derives nutrition from this *Tejo Jala*.

Cornea which is considered as *Krishna Mandala* is of *Vata Sthana* in *Chakshu Indriya*.[7] Hence *Vata* when

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afflicts the *Patalas* of *Krishna Mandala*, cause changes like *Jihmata* by affecting the corneal meridians.

The proper refraction of light rays in the eye is again held to be responsible by *Vata*. Hence both the *Sthanika* and *Agantuja Dosha* being *Vata*, affects the refraction leading to *Avyakta Darshana*/blurring of vision.

Tarpana and *Nasyakarma* are chosen for the study. *Tarpana* is one of the *Netra Kriyakalpas* which is indicated for *Tamo Darshana* and *Vakrata*. *Krishna Mandala* being of *Vata* origin needs *Preenana*, which is fulfilled by *Tarpana* using *Sneha*. *Tarpana* acts by the virtue of its procedural, pressure effect and its medicinal effect. The tissue contact time and bioavailability of the medicines is well achieved in *Tarpana*. And the sustained effect with 700 *Matrakalas* for *Krishnagata Roga* for 7days of duration, as said by *Acharya* Sushruta, helps in nourishing the whole *Krishna Mandala*. Due to the direct pressure applied over the cornea, *Tarpana* can help bring about the changes in the curvature of cornea leading to improved refractive power.

Mahatriphaladi Ghrita having ghee as a lipid base allows the drugs to penetrate into the corneal layers. The ghee which is processed by various *Kashayas* is amphiphilic. From the studies it is evident that lipophilic and hydrophilic properties of the medicines pass through cornea easily via trans-corneal route and para-cellular route respectively.[8] Also *Ghrita* which is best among the *Snehas*, carries all the properties of other drugs to the target organ without leaving its properties, due to the *Sanskaranuvartana Guna*.

Poor nutrition of the cornea may also lead to reduced corneal rigidity which results in increased corneal astigmatism due to pressure from the upper eyelid that flattens cornea in the horizontal meridian and makes steeper the vertical.[9] *Ghrita* having all such nutritional values help to promote the nutritional status of the cornea.

*B*y virtue of the *Swaroopa* of different *Gunas*, they pacify *Vata* and impart *Bala*. This occurs at the level of extraocular muscles also which brings about muscular strength and improved flexibility and at the level of cornea by changing the curvature and hence improving the refractive power.

Acc to *Sushruta*, *Samyak Tarpana* helps in achieving *Kriya Laghavata* of *Netra* i.e., normal functioning of eye in all aspects.[10] The restrictions during and after *Tarpana,* like complete restraints from reading, staring at any display screens also gives relief from the eyestrain. Hence *Tarpana* has the potential to change the curvature of the cornea allowing the proper convergence of light and therefore improves the visual acuity and dioptric power of the cornea in that meridian.

According to *Bhaisajya Ratnavali*, *Abhijita Taila* is indicated in *Timira* which restores the sight even in blind.[11] It induces the properties of *Rasayana* and *Preenana*.

According to *Sushruta Samhita*, *Acharya* has indicated *Snehana* type of *Nasya* in *Timira*, it is considered as *Drushtiprasadaka* and gives *Bala*.[12] *Bruhmana Nasya* is chosen for the present clinical study as *Acharya Charaka* explains that *Brumhana Chikitsa* is adopted where *Kaalantara Santarpana* is required. And *Snehadis* can be given for the same.[13] Here *Vata* afflicting the *Krishna Mandala* needs *Bruhmana Chikits*a. Hence *Nasya* with *Abhijita Taila* was chosen.

According to *Astanga Hrudaya*, *Nasa* being the gateway of *Shiras* (head),[14] the drug administered through nostrils reach *Shringataka* - a *Sira Marma* present in the middle of the junction of *Siras* supplying nourishment to the *Nasa, Karna*, *Netra* etc. From the studies, it can be understood that the *Shringataka Marma is* where the ophthalmic vein and the other veins spread out, i.e., the medicines used in *Nasya* reaches *Netra* by direct pooling into the venous sinuses of the brain via the inferior ophthalmic veins and by direct absorption into the cerebrospinal fluid.

Lipid soluble substances have greater affinity for passive absorption through the cell walls of nasal mucosa. The cilia of the olfactory cells and the portions of the body of the olfactory cells contain relatively large quantities of lipid materials.[15] Hence the *Snehana* type of *Nasya* is effective in pacifying *Vata* and does *Preenana*.

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Bruhmana Nasya administered relieves the eye fatigue. The medicines present in *Abhijita Taila* does *Bruhmana*, *Preenana* and promote *Bala* and flexibility to the ocular muscles.

According to *Sushruta*, *Samyak Nasya* yields in *Shiro Laghavata*, *Indriya Shuddhi*, *Vikaropashamah*.[16]

Yashtimadhu is *Chakshushya* and promotes *Bala* (here it imparts *Bala* to the *Peshis* of the *Netra*). *Prathama Patalagata Timira* mainly afflicts *rasa* and *Rakta Dhatu*. *Yashtimadhu*, *Kakoli*, *Ksheerakakoli* being *Jeevaniya Gana Dravyas* strengthen and provide nourishment the tissues of the eye by their direct action on *Rasa Dhatu*. According to *Bhava Prakasha*, *Shatavari* is said to be *Netrya*, *Balya* and relieves *Nayanaamaya*. *Kaideva Nighantu* has said it as *Chakshushya* and *Akshirogaghni*. *Kaideva Nighantu* and *Bhava Prakasha* considers *Bhringaraja as Akshirogahara*, as is *Chakshushya* according to *Raja Nighantu*, and it acts on *Rasa* and *Rakta Dhatu*. *Guduchi* is *Chakshushya* and *Balya*. Also, *Draksha* is *Chakshushya* according to *Kaiyadeva Nighantu*. *Haritaki* is *Chakshushya*, *Srotovishodhini*, *Yogavaahini*, *Sarva Dosha Prashamani*, *Bruhmana*, and *Vibhitaki* is *Netrahita*, relieves the *Doshas* from *Rasa*, *Rakta Mamsa* and *Meda*, *Amalaki* is *Chakshushya*, *Sarvadoshaghna*. *Go Ghrita* is *Chakshushya*, alleviates *Vata Dosha*, imparts *Brumhana* action and is *Indriya Bala Vruddhikara*.

Most of the drugs have *Madhura Rasa*. The *Madhura Skanda Dravyas* are *Sapta Dhatu Vardhaka,* are *Indriya Prasadaka*, *Balya* and promote *Preenana*, *Jeevana* and *Brihmana Gunas*. They possess *Snigdha Gunas*.

Snigdha Gunas by virtue of its *Swaroopa*, brings about *Mruduta* and pacifies *Vata* and imparts *Bala*. The drugs which are *Balya* promote strength to the extraocular muscles.

Similarly, the drugs present in *Abhijita Taila* like *Amalaki, Yashtimadhu* provide *Bruhmana* action. *Ksheera* present in it pacifies *Vata Dosha* owing to its *Guru, Snigdha Guna* and *Madhura Rasa. Tila Taila* is best *Vatahara* and due to its *Vyavayi Vikasi Gunas* it helps drugs penetrate into the minute channels.

Due to all the above properties of both the formulations, they act on *Timira* by their yoga *Prabhava.*

Conclusion

Going through the observations and results of Group A and B it can be concluded that patients of Group A who were treated with *Tarpana* revealed better results on overall assessment. In both the groups, within the group analysis, the effect of treatment was statistically highly significant in all the parameters i.e., *Avyakta Darshana*, eyestrain, headache, visual acuity and dioptric value. Though both groups showed highly significant differences within the group analysis; in between the groups, effect of treatment on *Avyakta Darshana* and eye strain showed significant differences, visual acuity and dioptric value showed highly significant difference and non-significant difference on headache.

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