



## Research Article

## A CLINICAL STUDY ON PADABHYANGA IN TIMIRA W.S.R. TO REFRACTIVE ERROR IN BAMS STUDENTS

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**KEYWORDS:** *Timira*, Refractive error, *Padabhyanga*, *Chakshushya*.

### ABSTRACT

**Background and Objectives:** *Timira*, one among the *Drushtigata netraroga* can be compared with many disorders from refractive errors to cataract. In the present study we have compared *Timira* to refractive errors which are considered as one among the avoidable blindness. Clinical features of *Prathama patalagata timira* are similar with the signs and symptoms of refractive errors. *Padabhyanga* is considered as *Chakshushya* and we have references in classics stating the utility of the same. With this background we have planned the work by selecting BAMS Students as the participants which will also motivate and inspire them for conducting further research. **Objectives:** To evaluate the therapeutic effect of *Padabhyanga* in the management of *Timira* w.s.r. to refractive error in BAMS Students. **Methods:** A randomised clinical study was taken up to scientifically validate the effects of *Padabhyanga* wherein 20 patients of *Timira* were selected. Patients were treated with *Padabhyanga* for 48 consecutive days. The effect of treatment was statistically analyzed using paired student's 't'-test. **Results:** Based on the statistical analysis *Padabhyanga* had better effect on all parameters thus managing the condition successfully. **Interpretation & Conclusion:** *Padabhyanga* is the effective modality of treatment which can be adopted in *Timira* w.s.r. to Refractive errors as a part of *Dinacharya* which is cost effective with minimum time duration.

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### INTRODUCTION

*Drushti* is defined as the functional unit of the eye. So, all the diseases confined to *Drushti* produce visual disturbances. *Timira* is one such disease included under *Drushtigata netrarogas* which are due to various etiologies. The condition where there is no error is Emmetropia. Here, the parallel rays of light from infinity come to focus on the *Drishtipatalam*, when accommodation is at rest. In any condition where, due to some refractive error, if the parallel rays of light from infinity do not come to a focus in the *Drishtipatalam* is called as refractive error.<sup>[1]</sup> Among all the causes of cause of visual disability in students, Refractive errors are considered as the most common cause where in the students who are addicted to electronic gadgets will be exposed to the illuminated screens. Using best-corrected vision; visual impairment was estimated to affect 161 million people globally in 2002, of which 37 million

were blind. The main cause of blindness and low vision was Cataract, and it was recognized that unless uncorrected refractive errors were included among the causes, visual impairment at global level was significantly underestimated.<sup>[2]</sup> Refractive errors comes under the avoidable type of blindness <sup>[3]</sup> wherein proper approach to treat the condition will definitely help to reduce the burden on the community by improving the quality of life of the affected individuals. Along with this even it helps to avoid the cosmetic problems which are arising due to the usage of spectacles and contact lenses.

*Padabhyanga* <sup>[4]</sup> is stated to be *Chakshushya* by all the *Acharyas* and it has to be included under *Dinacharya* which is even effective in treating *Timira*.

**OBJECTIVES**

To evaluate the therapeutic effect of *Padabhyanga* in the management of in *Timira* w.s.r. to refractive error in BAMS Students.

**Materials and methods****Source of data**

**Literary Source-** Classical Ayurveda texts, modern literatures, contemporary text books including the websites and journals to gather information about the disease and the drug.

**Sample Source-** Patients with the clinical features of *Timira* w.s.r. to refractive errors coming under the inclusion criteria of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year BAMS of SPSAMCH & RC, Arjunabettahalli was selected for the study.

**Drug Source**

*Dhanwantaram taila* for *Padabhyanga* was purchased from the pharmacy and authenticated by the faculty of *Rasashastra* and *Bhaishajya kalpana*, SPSAMCH & RC, Arjunabettahalli.

**Methods of Collection of Data****Study Design**

Human interventional controlled trial study design.

**Sampling Technique**

The subjects who fulfil the inclusion and exclusion criteria were selected using random sampling technique

**Sample Size**

- Clinical study where in 20 patients diagnosed as *Timira* of either sex were randomly selected.
- A case proforma containing all the necessary details pertaining to the study was prepared.

**Diagnostic criteria**

- Patients presenting with *Lakshanas* of *Timira*.
- Patients presenting with signs and symptoms of Refractive errors.

**Inclusion criteria**

- Patients of either sex from 3 batches of BAMS.
- Patients presenting with *Lakshanas* of *Timira*.
- Patients presenting with signs and symptoms of refractive errors.

**Exclusion Criteria**

- Patients with congenital refractive errors.
- Patients with other systemic diseases that interfere with the course of treatment.

**Intervention**

*Padabhyanga* with *Dhanwantaram taila* daily once at night for 48 days was done.

**Total Duration of the Study:** The total duration of the study in both the groups was 49 days.

**Assessment Criteria**

The clinical findings were noted in the case proforma and assessment will be done accordingly.

Day 1 – Before treatment (BT)

Day 49 – After treatment (AT)

***Padabhyanga* [5]*****Poorva Karma***

- Feet of the patient was washed and dried using cotton towel
- *Dhanwantaram taila* was taken in a bowl and made to lukewarm using hot water bath.

***Pradhana Karma***

The patient was made to comfortably lie down in prone position, after instructing about the procedure oil was taken in hands and *Abhyanga* was done to both the soles for 600 *Matrakala* alternatively.

***Paschat Karma***

After 10 minutes, patient was instructed to wash the feet with hot water

**Subjective Parameters**

1. Visual acuity
2. Subjective refraction by trial-and-error method
3. Headache
4. Eye strain

**Objective Parameter****1. Autorefractometry**

Visual activity - Snellen's chart	
Score	Criteria
0	6/6
1	6/9
2	6/12
3	6/18
4	6/24
5	6/36
6	6/60

**Trial and error/ Autorefractometry**

Score	Criteria
0	0-0.25
1	0.05-0.75
2	1.00-1.25
3	1.50-1.75
4	2.00-2.25
5	2.50-2.75
6	3.00-3.25
7	3.50-3.75
8	4.00

**Shirashula (Headache)**

Score	Criteria
0	No headache
1	Occasionally neither present nor troublesome
2	Frequently present, troublesome
3	Persisting throughout the day

	troublesome
2	Frequently present, troublesome
3	Persisting throughout the day

**Netrashula (Eye strain)**

Score	Criteria
0	No eye strains
1	Occasionally neither present nor

**Statistical Analysis**

- ❖ For the statistical analysis the data obtained in the group was recorded, presented in tabulations, diagrams and graphs.
- ❖ The parameters 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 paired 't'-test was applied within the groups.

**OBSERVATION**

Demographic Data			
	Criteria	No. of patients	%
Age	11 to 20 years	19	95
	21 to 30 years	01	05
Gender	Male	06	80
	Female	14	20
Religion	Hindu	17	85
	Muslim	02	10
	Buddhist	01	05
Marital status	Married	01	05
	Unmarried	19	95
Educational Status	1 <sup>st</sup> BAMS	08	40
	2 <sup>nd</sup> BAMS	09	45
	3 <sup>rd</sup> BAMS	03	15
Socio-economic status	Middle socio-economic class	20	100
Habitat	Urban	16	80
	Rural	04	20
Occupation	Student	20	100
Diet	Vegetarian	07	35
	Mixed	13	65
Sleep	Sound	18	90
	Disturbed	02	10
Family history	Present	12	60
	Absent	08	40
Nidana	Excessive usage of electronic gadgets	14	70
	Swapna viparyaya	02	10
	Kshuda vega nigraha	12	60
	Vishamashana	16	80
	Sukshma nirikshana	16	80

	<i>Ruksha-amla-katu ahara sevana</i>	08	40
<i>Lakshana</i>	<i>Avila darshana</i>	20	100
	<i>Shirashula</i>	08	40
	<i>Netrashula</i>	09	45
	<i>Netrasrava</i>	12	60
	<i>Netraragata</i>	08	40
	<i>Avila darshana</i>	20	100

## RESULT

BT-AT	Mean		Mean difference	Paired 't'-test				Remarks
	Before	After		SD	SE	t-value	p-value	
Visual acuity	2.57	1.68	0.89	0.50	0.08	10.83	<0.001	HS
<i>Shirashula</i>	1	0.25	0.75	0.46	0.16	4.58	<0.001	HS
<i>Netrashula</i>	1	0.22	0.77	0.44	0.14	5.29	<0.001	HS
Refractometry - Trial and Error method	2.5	1.16	1.33	1.01	0.16	7.88	<0.001	HS
Refractometry - Autorefractometry	2.87	1.30	1.56	1.25	0.22	7.79	<0.001	HS

Before treatment to after treatment, the p value (<0.001) revealed statistically highly significant with respect to all the considered parameters.

## DISCUSSION

One has to use his *Yukti* after proper analysis after going through retrospective references and prospective references to give a valid conclusion. *Timira*, one among the *Drishtigata rogas* was explained by all *Acharyas*. Acharya Sushruta explains 12 whereas Acharya Vagbhata explains 27. The disease *Timira* is produced when the vitiated *Doshas* are situated in the first and second *Patala*. When the vitiated *Doshas* affects the third *Patala*, it is termed as *Kacha* and when it involves the fourth *Patala*, it is *Linganasha*. The word meaning of *Timira* is darkness, but when the *Doshas* are in the fourth *Patala*, there is absolute darkness (*Su.S.Ut. 7/4*). Affliction of first *Patala* due to various etiologies leads to *Avyaktadarshana*. The cardinal symptom of refractive error is defective vision and hence *Timira* is compared to refractive error in the present study. Globally one to two billion people were affected by refractive errors. The rates vary between regions of the world with about 25% of Europeans and 80% of Asians affected. Nearsightedness is the most common disorder (Adults- 15-49%, Children- 1.2-42%). Young children and elderly people are commonly affected by Far-sightedness. The number of people with refractive errors that have not been corrected was estimated at 660 million (10 per 100 people) in 2013 and of these 9.5 million were blind due to the refractive error.<sup>[6]</sup> Along with cataracts, macular degeneration, and vitamin A deficiency, refractive

errors are considered as the common causes of vision loss. Owing to the above reasons it is a challenge to the ophthalmologists in both industrialized and developing countries. Hence it is the need of hour to find out an effective treatment which can provide the optimum eye care and prevent further complications. Thus, the present study is being undertaken to scientifically study and validate the effect of *Padabhyanga* in *Timira* w.s.r. to refractive error in BAMS Students.

## Discussion on Disease

The meaning of *Timira* is given as darkness in *Amarakosha*. From this etymological derivation it is clear that *Timira* means loss of light perception of darkness or blindness, but this stage is last in *Timira Roga*. Thus, the nomenclature of this disease was made on the basis of its grave sequel, which follows improper treatment of the diseases. So, *Timira* is a pathological condition in which vision gets reduced and ultimately leads to blindness- *Linganasha*. In Hypermetropia (long sightedness), parallel rays of light coming from infinity are focused behind the retina with accommodation being at rest. Thus, the posterior focal point is behind the retina, which therefore receives a blurred image. In myopia (short-sightedness), parallel rays of light coming from infinity are focused in front of the retina when accommodation is at rest. Astigmatism is a type of refractive error wherein the refraction varies in the different meridians. Here, the rays of light entering in the eye cannot converge to a point focus but forms the focal lines. There are two types of astigmatism: regular and irregular. The symptoms include

defective vision, tiredness of eyes, frontal or fronto-temporal headache, watering and mild photophobia, Half shutting of the eyes may be complained by parents of the child. The child does so to achieve the greater clarity of stenopaic vision, degenerative eye changes in case of myopia, depending upon the type and degree of astigmatism, objects may appear proportionately elongated, nausea and even drowsiness.

### Discussion on Drug

Most of the drugs in *Dhanwantaram taila* area said to be *Chakshushya*, *Rasayana* and *Balya* with *Tridosha shamaka guna*. The pharmacological actions include anti-oxidant, free radical scavenging, anti-inflammatory, immunomodulating effect. *Dhanwantaram taila* contains *Tila*, *Bala*, *Bilwa*, *Kushta*, *Shaileya*, *Ela*, *Vacha*, *Gokshura*, *Shalaparni*, *Prishnaparni*, *Brihati*, *Patala*, *Agnimatha*, *Shyonaka*, *Shatavari*, *Devadaru*, *Twak*, *Shatahwa*, *Manjishta*, *Kulatta*, *Methika*, *Jeevaka*, *Mashaparni*, *Mudgaparni*, *Amalaki*, *Haritaki*, *Punarnava*, *Chandana*, *Sariva*, *Ashwagandha*, *Yashtimadhu*, *Bibhitaki*, *Bala*, *Kantakari*, *Shaileya*, *Gambhari*, *Kakoli*, *Rishabhaka*, *Kola*, *Parpata*, *Paya* (Ref: A.H. Sha-2 / 47-50).

### Discussion on Procedure

In the *Padamadhya*, there are 2 *Siras* which are directly connected to *Chakshu*. By doing *Padabhyanga*, these *Nadis* are nourished in turn the *Chakshurendriya Shakti* is increased. Mainly the *Vata dosha* is responsible for *Timira roga*, *Abhyanga* is having the *Guna-karma* of *Vatashamana* and hence this is considered as an added effect along with *Chakshurenriya prasdana*. The *Sira* means *Srotas* (channels) and these two *Srotas* (*Mamsavaha* or *Snayuvaha*) from *Pada* go to eyes. These *Siras* may be the two *Nadis*, *Gandhari* (which connects left great toe to left eye) and *Pusha* (which connects right great toe to right eye) described in *Yoga Shastra*.

Anatomically there exist no such vessels but can consider the *Siras* as neurovascular bundles because sole of foot has very rich nerve anastomosis. Stimulation of this neurovascular bundle benefits the body as a whole and eyes especially by nourishing eye muscles and reduces the eye strain. According to *Samanya vishesha Siddhanta* (co-inherence and distinction principle), by pedal inunction ectodermal tissues of skin were nourished thereby nourishing its other derivatives in eye and improved the functions of the eye and reduced eye strain. Ayurveda explains that *Pada* and *Netra*, both have its origin from *Vaikarik* (modifying or modified source of creation) and *Rajas Ahamkara* (passionate source of creation) and also both develop at same month in intrauterine life. Thus, by therapy on *Pada* we can have its effects on *Netra* because of their same origin.

According to Physiology, by *Padabhyanga* the somatic sensory area in the cortex may get stimulation and as both feet and eyes are in the same area i.e., area II of cortex, its stimulant effect may go to the eyes and may act by improving the function of eyes and reducing the eye strain. Also, by *Padabhyanga* there might be nourishing or stimulation effect on eyes through the interpretative (association) areas of feet and eyes, as both meets at Wernicke's area and improving the function of eyes and reducing the eye strain.

### Discussion on Clinical Study

#### Discussion on Observation [7-13]

**Age:** Maximum number of patients belongs to the age group of 11 to 20 years. One of the reasons is the study is conducted on BAMS students where almost all the students will come under this age group. The other reason could be the number of people aged 16-39 years visually impaired from uncorrected refractive errors is 27 million, a prevalence of 1.1% globally.

**Gender:** The gender influence of refractive error is established in the present study as the majority of patients were female. During menstrual cycle, in adolescent females the spherical lens and other related ocular parameters vary sensitively due to variation in E2 levels.

**Religion:** Majority of patients were Hindus in the present study. This could be due to the prevalence of Hindus in the place where the research was conducted.

**Marital status:** Majority of patients were unmarried as the study was conducted on BAMS students and no conclusion can be drawn on this parameter.

**Educational status and occupation:** The study was conducted on BAMS students. We can consider the following points which support the educational status and influence on refractive errors. There is a strong correlation between the development of myopia and education which is proven by numerous studies on school children. Near work (accommodation) will not only responsible for developing myopia, it affects learning process also (memorizing). This was already stated beautifully by Randall in 1885: Hypermetropia is the prevailing condition of the refraction of most animals, children, uncivilized peoples and eyes uninjured by the educational process. A 2-year longitudinal cohort study was carried out on 156 Caucasian medical students from the University of Copenhagen, Denmark, from 2005 to 2007 to study the effect of physical activity on the development and progression of myopia. The results showed that intensive studying can be a risk factor of myopia. Especially the students in the early twenties are more prone to

developing myopia. There is a high prevalence of myopia in college students and rarely does occur in less educated populations.

**Socio-economic Status and Habitat:** Majority of the patients are from middle – socioeconomic status and urban areas. In a study, they found a strong relationship with urban and suburban populations. Urban school children showed the worst initial VA as well as BCVA. They revealed that the school children in urban and suburban residential area had 2 times higher risk for developing URE (including severe visual impairments, blindness and amblyopia).

**Diet:** Majority of patients were consuming mixed diet. There is a no strong evidence of presence of relation between diet and refractive error. Though the studies reveal lack of proteins high carbohydrate diet and negligible fruit and vegetable intake seem to be one of the causes of poor visual acuity in school children. Papers published reveal that there is a link between a high glycemic diet and myopia remains a theory but it would be an interesting area for future research. No relevant studies were found in the search period for an association between diet and hyperopia or astigmatism.

**Sleep:** In the present study 2 patients were having disturbed sleep though there is an impact on sleep and refractive error because of small sample size conclusion cannot be drawn.

**Family history:** 12 patients were having positive family history which clearly suggests the relation between the association of genetics and refractive error.

### Discussion on Nidana

Using excessive electronic gadgets, *Swapna viparyaya*, *Kshuda vega nigraha*, *Vishamashana*, *Sukshma nirikshana*, having *Ruksha amla katu ahara sevana* are considered as *Nidanas* in the present study. The literary review reveals that the above said are the *Nidanas* to cause the disease and even it causes other *Netra rogas* also and the present observation supports the same. Due to effects of both *Aharaja* and *Viharaja nidanas*, *Vatadi dosha* will be vitiated and pathologically lodges in *Netra patalas* causing *Timira*. Acharya Vagbhata in *Rogaanupadaniya adhyaya* says *Kshudha vega dharana* leads to *Indriya dourbalya*. We can consider that irregular intake of food may cause loss of nutrition even for eye for its normal functioning. Other *Viharaja nidanas* causes severe eye strain which can contribute to the irregular mechanism of vision.

### Discussion on Lakshana

*Avila darshana* is the cardinal feature of *Timira*. Most of the cases of astigmatism & hypermetropia presents with headache than blurring of vision. Because of ciliary muscle contraction & accommodation, there will be high rate of headache in hypermetropes and astigmatics.<sup>[13]</sup> Eye strain and watering of eyes are considered as asthenopic symptoms in refractive errors. The severe eye strain may cause redness of eyes if left untreated.

### CONCLUSION

*Timira* one among the *Drushtigata netra roga* can be compared to refractive errors with the symptoms of defective vision for distant objects and near objects sometimes associated with asthenopic symptoms like tiredness of eyes, frontal or fronto-temporal headache, watering, photophobia. Specifically, *Prathamapatalagata timira* can be correlated to Refractive errors. If *Timira* is not treated at proper time it may cause *Kacha* and finally *Linganasha* and hence special attention has to be given to treat *Timira* as early as possible. The study was conducted on 20 patients of *Timira* (refractive errors), with *Padabhyanga* for 48 days. As per *Bruhatrayi*, *Padabhyanga* is considered as *Chakshushya* and the same thing is established in the present study also. Acharya Vagbhata says two *Nadis* are situated in *Padamadhya* and by nourishing the two *Nadis* with *Padabhyanga* the *Chaskhurendriya Shakti* will be increased by the nourishment of the *Chakshu* and its *Avayavas* by which the clarity of vision will be enhanced. *Padabhyanga* can be an effective modality of treatment which can be adopted in *Timira* w.s.r. to refractive errors as a part of *Dinacharya* which is cost effective with minimum time duration.

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