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Role of Eye Exercise in Astigmatism: Power of Visual Training

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ABSTRACT:
Ayurveda has stated the importance of eye with a quote "*Sarvendriyanam nayanam pradhanam*" [(1)]. *Timira*[(2)] is classified as one of the *Dristigata rogas* and is referred to as a *paramadharuna vyadhii*[(3)], which means it is progressive and can lead to blindness. Timira covers a wide range of refractive errors, including astigmatism. Astigmatism is a type of refractive error in which refraction varies in different meridians of the eye, consequently the light rays entering the eye cannot converge to a point of focus, but form various focal lines[(4)]. Standard management primarily relies on spectacles, contact lenses, or surgical correction; however, interest in complementary and non-invasive interventions has grown. American ophthalmologist William H Bates in his book "Perfect eye sight without glasses" -advised a number of eye exercise for managing refractive errors including astigmatism[(5)]. Eye exercises such as Bar exercise, Focus shifting exercise, Rolling exercise, *Trataka yoga kriya* have been proposed as a supportive approach for individuals with astigmatism, particularly to alleviate visual discomfort and improve ocular efficiency. These exercises generally target strengthening of extraocular and ciliary muscles, improving accommodation, enhancing binocular coordination, and reducing digital eye strain. While eye exercises cannot directly alter corneal curvature or eliminate the refractive error, they may contribute to improved visual function, better focusing stability, and reduced asthenopic symptoms such as headaches, eye fatigue, and difficulty in sustaining reading tasks. This paper highlights the importance of eye exercise, its positive impact on visual comfort and improving the quality of life in astigmatic patients.

KEYWORDS: Astigmatism, Asthenopia, Eye Exercise, Visual training, Ocular health.

INTRODUCTION:

Netra is described as *Pradhana indriya* in classical text, as vision plays a dominant role in perceiving the external world. *Acharya vagbhata* emphasizes the significance of eye health stating that person who wants a long life must always take care of their eye [(6)].

Astigmatism is one of the most prevalent refractive errors affecting individuals across all age groups, characterized by an irregular curvature of the cornea or, less commonly, the crystalline lens. This irregularity leads to unequal refraction of light rays entering the eye, resulting in blurred or distorted vision at all distances. Depending on the orientation and magnitude of the principal meridians, astigmatism may present as simple, compound, or mixed, and may further be classified as regular or irregular. It often coexists with other refractive errors such as myopia and hypermetropia. The asymmetrical surface of

cornea in astigmatism leads to blurred vision, difficulty in focusing on lines and words, that causes asthenopic symptoms like headache, eye strain, Watering of eyes [4], thereby contributing significantly to visual impairment and reduced quality of life.

Astigmatism is a common refractive errors which is about 13% of refractive errors of the human eye[7].The increasing incidence of astigmatism and other refractive errors is largely attributed modern lifestyle factors such as screen time (computer, television) , poor dietary habits and reduced outdoor activities[8].Recent studies and WHO reports shows that the refractive errors are the primary cause of visual impairment and secondary cause of visual loss worldwide as 43% of visual impairment are attributed to refractive errors[9] .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. [10]

Astigmatism can be managed using spectacles, contact lenses or surgical procedures like LASIK and keratectomy. However, these treatments do not cure the condition or prevent its progression. Each option comes with its own drawback spectacles may be cosmetically unappealing, contact lenses can cause corneal abrasions, surgeries like LASIK carry risks such as keratitis, corneal perforations, and are of high costs[4].

According to American ophthalmologist William H Bates in his book "Perfect eye sight without glasses" mentioned that refractive errors including astigmatism is caused due to improper use of eyes, which results in eye strain and he has advised number of eye exercises which helps in curing them [5].

Eye exercises such as Bar exercise, Focus shifting exercise, Rolling exercise, *Trataka yoga kriya* have proven their efficacy in improving refractive errors through many studies[11]

Given this background, the present review aims to comprehensively examine the role of eye exercises in the management of astigmatism. It focuses on understanding the theoretical basis, types of exercises, proposed mechanisms of action, and available clinical evidence supporting their use. By synthesizing existing knowledge, this article intends to provide a balanced perspective on whether eye exercises can be considered a meaningful component in the contemporary management of astigmatism.

METHODS :

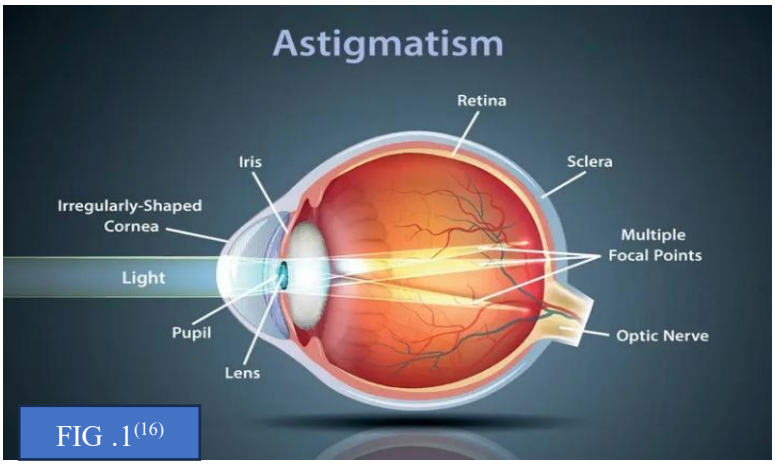

FIG .1[16]

1. Eye wash[12]
2. *Trataka yoga kriya* [13].
3. Bates method of eye exercise are as follows[14].;

1. Palming
2. Shifting and swinging of ball

3. Bar Exercise
4. Focus Shifting Exercise
5. Eye roll exercise clock wise and anticlock wise

EYE WASH: Fill both the eye cups with solution preferably *Triphala Kashaya* nearly to its brim, put it against the eyes, gently keep the eyes downwards in the eye cup and blink it twenty times, wash the eyes for one minute.

MODE OF ACTION:

Triphala - Shothahara, Rasayana, Lekhana and *Shodhana* property, Antioxidant action – rich in vitamin C, neutralizes free radicals, prevent oxidative damage to ocular structures, delay degenerative changes, antimicrobial, anti inflammatory action, enhanced microcirculation, cleansing effect, improves tear film and lubrication[15].

1. *TRATAKA YOGA KRIYA* :

FIG .2[17]

Here the patient was made to sit in a comfortable meditative posture. Place a lit candle at eye level about 2-3 feet away, gaze steadily at the tip of the flame, just above the wick, do not blink, continue gazing for 1 min. Then close the eyes gently, visualize the flame at the space between the eyebrows, rest and breathe naturally. Repeat for 3 rounds.

MODE OF ACTION:

Enhances visual attention and stabilizes fixation, which can help improve coordination of the extraocular muscles. In individuals with astigmatism, it aids in reducing visual distraction and eye strain by promoting controlled and sustained focusing. The exercise also provides a calming effect on the visual system, reducing mental and ocular fatigue.

2. BATES METHOD OF EYE EXERCISE ARE AS FOLLOWS[13];

1. PALMING -Patients were asked to sit on a comfortable chair, rub both the hands till they become warm, with closed eyes, cover the eyes with palms (fingers crossed upon the forehead), elbows resting on a cushion in such a way to avoid pressure on the eye ball till perfectly black field before the eyes was experienced. While palming patients are advised to inhale and exhale slowly. Palming was practiced for 20 counts.

MODE OF ACTION - Promotes relaxation of both the extraocular and intraocular muscles, particularly reducing tension in the ciliary muscle that is involved in accommodation. In individuals with astigmatism, prolonged visual effort often leads to accommodative fatigue and ocular discomfort. Palming helps alleviate this strain by allowing the visual apparatus to temporarily disengage from continuous focusing activity.

In addition, the absence of light stimulation during palming provides a form of sensory rest to the retina and higher visual pathways. This may contribute to reduced neural fatigue and improved visual comfort. The technique is also associated with a calming effect on the autonomic nervous system, encouraging a shift toward parasympathetic dominance, which supports overall relaxation and reduction of eye strain.

2. SHIFTING AND SWINGING OF BALL

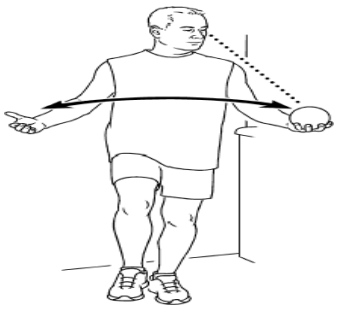

FIG .3[18]

1. Shifting of ball: Here the patient is asked to sit or stand comfortably, hold the ball in one hand in front of face, move the ball slowly from left to right, up and down. Follow it with only eyes, not head, duration 2 min.
2. Swinging of ball: Stand 1 feet apart, hold a light ball or pendulum like object, swing it gently from side to side, let only the eyes follow the swing not head. Duration is 2min.

MODE OF ACTION:

This exercise engages the extraocular muscles, improving their flexibility and synchronization. In individuals with astigmatism, it helps reduce visual strain by promoting balanced eye movements and minimizing fixation stress. The rhythmic tracking of motion also enhances eye–brain coordination and reduces fatigue associated with prolonged static focus.

3. BAR EXERCISE :

Here the patient is asked to focus on Bars either vertical , horizontal , diagonal , near –far bars Do this for 8 bars pausing each bar for 2-3 seconds. The same repeated for all bars as well Whole procedure repeated for 5 times.

BAR EXERCISE	ACTION
HORIZONTAL BAR MOVEMENT	Lateral rectus of one eye + medial rectus of other eye act simultaneously
VERTICAL BAR MOVEMENT	Superior rectus +Inferior rectus alternate for elevation and depression
DIAGONAL MOVEMENT	Combination of recti and oblique muscles for smooth tracking
NEAR – FAR BAR MOVEMENT	Strong action of medial rectus (convergence) Relaxation of lateral rectus

4. FOCUS SHIFTING EXERCISE:

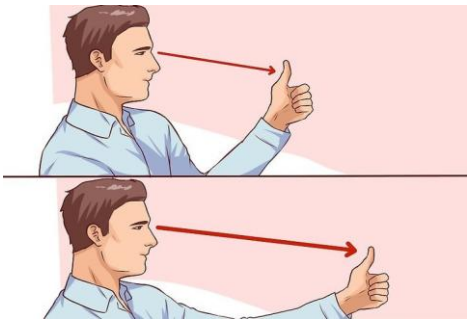

FIG .4[19]

Sit on a chair or stand in front of blank wall. Hold the thumb or a pen 10 inches from the face and focus on it for 10 -15 second. Then shift the gaze on the object 5-10 feet away followed by gazing a object 10-20 feet away for 10-15 seconds without moving head Again focus on the thumb, repeated for 5 times.

MODE OF ACTION:

Activates and relaxes the accommodative mechanism of the eye. This helps reduce ciliary muscle fatigue commonly associated with prolonged visual tasks in individuals with astigmatism. By improving accommodative flexibility and coordination between focusing and eye movements, the exercise enhances visual comfort and reduces symptoms like eye strain and fatigue. Although it does not alter corneal curvature, it supports functional vision and acts as an adjunct in managing astigmatic symptoms.

5. EYE ROLL EXERCISE:

FIG .5[20]

Clockwise and Anti clock wise– Sit comfortably, by looking up, slowly roll your eyes in a circular motion, move eyes slowly to right down towards the floor, then to left (clock wise) repeat for 5 times. Then repeat in anti clock wise 5 times.

MODE OF ACTION:

This exercise engages the extraocular muscles, improving their flexibility and synchronization. In individuals with astigmatism, it helps reduce visual strain by promoting balanced eye movements and minimizing fixation stress. The rhythmic tracking of motion also enhances eye–brain coordination and reduces fatigue associated with prolonged static focus.

RESULTS:

MECHANISM	ACTION OF EYE EXERCISE	EFFECT IN ASTIGMATISM
Muscle Relaxation	Relaxes extraocular and ciliary muscles	Reduces eye strain and ocular fatigue
Accommodative Improvement	Enhances flexibility of focusing mechanism	Improves clarity during near and distance tasks

Ocular Coordination	Promotes synchronized eye movements	Better fixation and tracking ability
Neuromuscular Balance	Improves coordination between eye muscles and neural control	Enhances overall visual efficiency
Reduction in Asthenopia	Decreases strain from prolonged visual activities	Relief from headache, discomfort, eye fatigue
Visual Attention and Fixation	Improves ability to maintain steady gaze	Reduces visual distortion and perception
Circulation Enhancement	Promotes blood flow around ocular tissues	Supports relaxation
Sensory Rest	Provides relaxation to retina and visual pathways	Reduces visual and mental fatigue
Autonomic Regulation	Shifts towards parasympathetic state	Decreases stress related visual symptoms
Functional Vision Improvement	Enhances performance without altering structure	Better visual comfort and endurance

DISCUSSION:

Eye exercises play a significant role in managing asthenopic symptoms. For better understanding, asthenopia can be categorized into extraocular and intraocular types.

Extraocular asthenopia mainly arises due to excessive strain on the extraocular muscles. Continuous effort during convergence overworks the medial rectus muscle, while habitual lid squeezing to achieve a stenopic effect further increases muscular fatigue. This strain may manifest as brow headache, ocular discomfort, reflex lacrimation, and even referred pain resembling ophthalmoplegia. Additionally, during attempts to maintain clear vision, the frequency of blinking often decreases, leading to inadequate tear film replenishment and resulting in transient blurring of vision. Fatigue of the eyelid muscles may also irritate the conjunctiva, causing burning sensation. As a result, individuals tend to rub their eyes frequently for relief, which can worsen conjunctival congestion and may eventually lead to chronic conjunctivitis[(11)].

In contrast, intraocular asthenopia is primarily associated with dysfunction of the ciliary muscles. Sustained accommodative effort can induce ciliary spasm, leading to ocular fatigue, pain, and associated symptoms such as burning sensation and watering of the eyes[(11)].

Practices like candle light concentration and others are believed to enhance the visual function. By engaging both extraocular and intraocular mechanisms, such practices improve functional efficiency of the visual system. They are also thought to stimulate the activity of photoreceptors (rods and cones) through processes involving light and dark adaptation.

From an Ayurvedic perspective, the eye *(Chakshurendriya)* is one of the most extensively overused sense organs, often subjected to excessive *(Atiyoga)* usage. In the context of modern lifestyle changes and increased visual demands, it becomes essential to promote awareness regarding proper eye care. Establishing a regular routine for ocular relaxation can not only help alleviate refractive and asthenopic symptoms but may also aid in preventing degenerative ocular conditions.

Appropriate eye exercises enhance *Rasa* and *Rakta Samvahana* (circulation), thereby improving the functional efficiency of the visual apparatus. Mild disturbances in these Dhatus may be corrected through such practices, while in moderate to severe conditions, they serve as effective supportive therapy.

However, non-invasive practices such as palming, rolling, and focusing exercises provide significant symptomatic relief. These exercises improve extraocular muscle coordination, enhance accommodative function, stimulate ocular blood circulation, and reduce visual fatigue. Several studies indicate that such exercises can support binocular vision, improve focusing stability, and relieve asthenopic symptoms such as headaches and blurred vision.

CONCLUSION:

The burden of refractive error due to digitalization on individuals, especially school going children, cannot be underestimated. Moreover, as the prevalence of refractive errors continues to rise. Introducing eye exercise with proper guidance in individual's daily life helps promoting eye health and preventing the further progression of these visual conditions. Thereby giving promising approach in promoting eye relaxation, mindfulness, and overall wellbeing.

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