

Vision Management in Adolescents with Visually Impaired: The Effect of Yogic Visual Concentration

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Abstract

According to World Health Organization (WHO), 314 million individuals worldwide suffer from some degree of vision impairment. Yoga is an effective intervention for the purification and preparation of the body. The leading cleaning practices such as yoga postures, breathing control, and meditation, among others. These techniques include a yogic visual concentration technique known as Trataka. According to certain studies, yogic visual concentration improves eyesight. However, the immediate effect of trataka on visual acuity in adolescents with the visually impaired has not been investigated.

Purpose. The present study investigated the effect of 6 weeks of trataka training on visual acuity in visually impaired adolescents.

Material & Methods. The study used a single group, before/after design, with ten visually challenged adolescents ($Mage=16.5$ years; $SD=1.5$; range 15-18 years) participating in a 6-week trataka training. In clinical settings, the Snellen chart is the most used tool for determining a participant's level of visual acuity.

Results. The outcome score for left eyesight (44.44 per cent) and right eyesight (50.43 per cent) improved significantly. Furthermore, paired t -test findings revealed significant improvement in both left eyesight ($p<0.001$; $ES=0.87$) and right eyesight ($p<0.001$; $ES=0.83$) following 6 weeks of trataka training.

Conclusions. The findings of this study objectively show that the yogic visual concentration training may be more effective in adolescents with the visually impaired. Future studies with larger sample size and a more substantial research design based on objective variables are required to strengthen the study's conclusions.

Keywords: Yogic visual concentration, Trataka, Eyesight, Vision quality, Adolescents.

Introduction

Thousands of years ago, India was given the gift of yoga to bring happiness and joy (Desikachar & Cravens 2011). It is also mentioned in Rig Veda's ancient scriptures and other documents as a collection of songs, rhyme, and practices utilized by Vedic priests to perform their sacred duties (Koller, 2018). Following Patanjali, several individuals contributed to the development of yoga, which has now spread worldwide (Basavaraddi, 2015). Swami Vivekananda defined yoga as a discipline that connects a person to "reality" or "God." Yoga exercises are therapeutic for overall health and well-being (Light, 2020). Yoga comes in various forms, like Shatkarma, a collection of traditional cleansing techniques that detoxify and cleanse specific organs and the mind (de-Manincor et al., 2016).

Yoga visual concentration (trataka) is one of the six purification meth-



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ods outlined in the ancient Indian yogic literature Hata Yoga Pradipika. The Sanskrit term *trataka* means "to gaze steadily" (Raghavendra & Singh, 2016). *Trataka* is the practice of gazing fixedly at a single location until one's eyes well up with tears (Svatmarama, 2002). According to the Hata Yoga Pradipika, the practice of *trataka* eliminates all eye disorders, weariness, and lethargy (Svatmarama, 2002). As a cleansing treatment, *trataka*'s final stage generates a state of meditative mentality with eyes focus length adjustment pressure. Meditation enhances attention when done for an extended period. Meditation has been proved to improve one's eyesight in numerous studies (Mehra et al., 2020). This may have a more significant effect on vision (eyesight) enhancement. Thus, the researcher framed and solved a human health issue (Ocular impairment) through clinical trials involving yogic exercises. Our traditional system is *Trataka yoga kriya*, where we believe in improving vision quality in the eyes, and it's also considered a non-paramedical healing process (Gopinathan et al., 2012).

Many people in India live below the poverty line and cannot afford corrective techniques that require regular screening and monitoring. We should focus on reducing visual acuity and improving people's quality of life because the numbers and prevalence of visual impairment as a cause are big enough (Sheeladevi et al., 2019). However, no studies analyze the effect of *trataka* on eyesight quality. As a result, the current study was designed to evaluate the immediate effect of *yoga kriya trataka* exercises on vision improvement by assessing the Snellen eye chart test.

Material and methods of research

Participants

The investigator was asked to refer patients with low visual acuity from the Sri Ganesh Laboratory Nihal Khara village, Fazilka region, Punjab. After interviewing and examining 17 patients, the study included ten patients who completed informed consent forms. The institutional ethical board approved the study (Department of Physical Education, Central University of Punjab, Bathinda). The selected participants were men aged 16.5 ± 1.5 years (range 15-18 years) with a history of visual acuity for at least ten months with a level of acuity less than (2.50sp); they had to be motivated to restore to their earlier level of vision. The exclusion criteria were more than the acuity level (2.50sp). Additionally, those who had more diopters scale were excluded from the investigation.

Assessment

The Snellen chart is still the most used method in clinical settings to assess patients' level of visual acuity (Tsui & Patel, 2020; Zapparoli et al., 2009). Eye doctors have used several charts throughout history. The Snellen chart is the most frequently encountered in clinical settings (Azzam & Ronquillo, 2020). The Snellen chart uses a geometric

scale to test visual acuity in this study, with 20/20 being the standard. The numerator and denominator are based on how far away a person with great eyesight can still read the smallest line that the patient can see from their current position (in feet). Optotypes are the nine letters on the chart: C D E F L O P T Z. Finally, the sizing of letters is geometrically consistent, that 20/40 optotypes are twice the size of 20/20.

Study Design

In a single group, pre and post-experimental designs were used in this study. A self-controlled and purposive sampling method was adopted. Before and after the training programme, each participant was evaluated. Six weeks of yoga practice of 25-40 minutes each day, four days per week. All the subjects were practised in a calm yoga hall under the supervision of an instructor.

Intervention

Participants received six weeks of *trataka* training. On the first day, a skilled yoga teacher presented the theory of *trataka*. During the session, audio instructions for *trataka* were played. *Trataka* has two unique stages; the first level is eye exercises, which prepare you for *trataka yoga*. The eye workouts involve circular and horizontal eyeball movements. These were done in a well-lit room, with eyes open. Then came palming to relax the eyes. Palming involves placing slightly cupped palms over the eyes to create total darkness. The initial stage lasted ten minutes. *Trataka* was the second stage, which was done in a dark room. The participants were instructed to focus their eyes on the candle flame for around 2-3 minutes, resisting the impulse to blink as much as possible even if participants get tears in their eyes. Then they were instructed to envision a candle flame between their brows. This procedure was performed twice or thrice. Finally, participants were urged to focus on the present moment, and the practice concluded with silent prayer. The second stage was 15 minutes long. The entire practice lasted 25 minutes.

Data extraction

Snellen Eye Test Visual acuity values follow a straightforward rule. Calculate the line that a person may easily recognize on a Snellen chart. If that line is twice the width of the reference standard (20/20), the individual's Magnification Requirement (MAR) is 2x the width of the reference standard. When the Magnification Requirement is set to 2x, the visual acuity is reduced to 1/2 (20/40). Similarly, if the magnification requirement is 5x, visual acuity is 1/5 (20/100); if the magnification need is 10, visual acuity is 1/10 (20/200). For individual assessment, the researcher developed a criterion with different stages based on vision quality data before and after the experiment, such as if the individual differences with 0.50 impact in vision quality either spherical or cylindrical dioptric power as a marked stage, 0.25 as moderate healing stage and unchanged impact stage.

Statistical Analysis

To ascertain whether there were any considerable differences between the before and after the score of the dependent variables, a paired-sample *t*-test was performed. Before conducting the analysis, the assumption of normally distributed difference scores was examined. Data were tested for normality using the Shapiro-Wilk test and were normally distributed, suggesting the use of parametric statistics (Table 1).

Table 1. Test of Normality

Variables	Shapiro-Wilk		
	Statistic	df	Sig.
LES	0.904	10	0.245
RES	0.874	10	0.111

Note. LES: Left eyesight; RES: Right eyesight

There were no outliers in the data, as assessed by inspection of boxplots. The assumption was considered satisfied, as the skewness and kurtosis levels were estimated which is less than the maximum allowable values for a *t*-test (i.e., skewness < |2.0| and kurtosis < |9.0|; (Posten, 1984). It will also be noted that the correlation between the two conditions was estimated ($p < 0.000$), suggesting that the paired *t*-test is appropriate in this case. Cohen *d* effect sizes (ES) were also calculated to determine the magnitude of the differences before and after the intervention. ES were classified as follows: <0.2 was defined as trivial, 0.2-0.6 was defined as small, 0.6-1.2 was defined as moderate, 1.2-2.0 was defined as large, and >2.0 was defined as very large (Milanovic et al., 2014; Hopkins et al., 2009; Hopkins, 2003; Cohen, 1988). Data were presented as mean, standard deviations (*SD*) and percentage changes (per cent). The per cent change in the mean score was calculated using the following formula: $\text{before mean} - \text{after mean} / \text{before mean} \times 100$. We used a double data entry process and SPSS Statistics, version 23, for the data analysis. The statistical significances were expressed as * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Results of the study

The paired sample *t*-test was a statistically significant, $t(9) = .85$, $p < 0.001$. Results indicated that left eyesight scores after the yogic visual concentration training ($M = 0.75$, $SD = 0.45$) were significantly

lower than the scores prior to the training ($M = 1.35$, $SD = 0.65$). Cohen's *d* computation was 0.87 (0.6-1.2), indicating that the yogic visual concentration training had a moderate effect on left eyesight scores. Findings indicated significant mean differences on right eyesight with $t(9) = 6.86$, $p < 0.001$. Results show that mean scores on right eyesight in before training ($M = 1.15$, $SD = 0.57$) subsequently decrease in the after training ($M = 0.57$, $SD = 0.33$). Cohen's *d* was 0.83 (0.6-1.2), indicating a moderate effect size (See Table 2). The graphical representation of the means and standard error of left and right eyesight is displayed in figure 1.

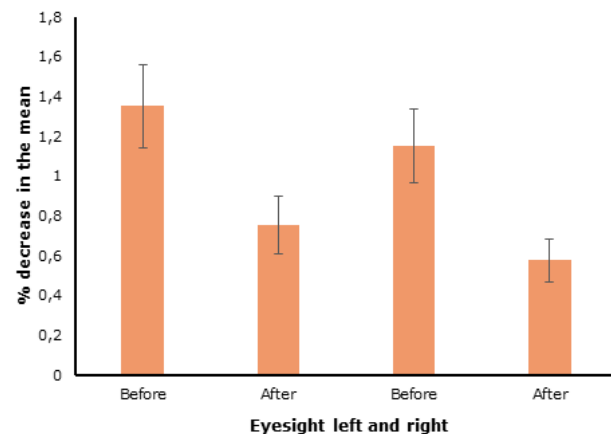


Figure 1. Means and Standard Error for Left and Right Eyesight.

Discussion

According to evidence-based studies, there is no doubt that current cosmetic and medical therapies are viable answers. Still, these solutions are not permanent, don't have a 100% success rate, and have probable side effects that could be mild or substantial. Eye exercise, Trataka Yoga Kriya, and Acupuncture are all alternative traditional healing therapies (Traditional healing process) widely used worldwide, especially for enhancing Eye vision quality. School for Perfect Eyesight at Pondicherry is one of the most renowned institutes in India that uses this technique. Several studies have been done on the effectiveness and acceptability of these strategies (Mehra et al., 2020).

Trataka yoga kriya and eye practice are based on traditional relaxing techniques. Eyesight is improved when the mind and body are at ease. An

Table 2. Dependent variables, before and after values, significance level after the paired *t*-test and effect size

Dependent variable	Before	After	Percentage gain in eyesight	Paired samples test sig.	ES
LES	1.35 (.65)	0.75 (0.45)***	44.44	0.000	0.87
RES	1.15 (.57)	0.57 (0.33)***	50.43	0.000	0.83

Note. LES: Left eyesight; RES: Right eyesight; ES: Effect size.

* - $p < 0.05$; ** - $p < 0.01$; *** - $p < 0.001$, refers to significant differences between before and after measurement.

aesthete's features are enhanced via eye exercises. Trataka is founded on the scientific truth that the movement of the eyeballs may be used to reveal our thoughts. When we focus our Eye vision attention on one thing, our wandering thoughts fade away or disappear altogether. In addition, the eye's steadiness improves (Bates, 2021).

Regarding eye health education, the community has primary responsibility in today's fast-paced world. In addition to helping with refractive issues, maintaining a routine for prompt eye relaxation (traditional) can also help prevent a slew of degenerative disorders. These researchers were hoping to spread the word about the trataka yoga exercise as a simple practice that can help avoid numerous ocular disorders and alleviate many visual issues in this current society.

It was determined that the trataka yoga kriya was effective in treating timira, according to Gopinath et al. (2012). There was no significant improvement in any of the patients' aesthenopic symptoms in the group that received eye exercises. In the Trataka group, one patient showed moderate improvement, 20 patients showed mild improvement, and ten patients showed no change. One line of progress was found in Snellen's chart reading. Visibility, contrast sensitivity, and object sharpness improved to a moderate extent. Even though the improvement was nearly identical, patients in the Trataka Yoga Kriya group reported greater alleviation than those in the other groups.

An investigation into yogic practice's effects on high school girls' myopia was conducted (Lolage & Jadhav, 2013). Myopia is a common problem among high school girls, and researchers wanted to analyze if yogic practice may help alleviate it. Anulom-vilom, Kapalbhathi, Eye exercise, & Trataka were part of the instruction in Yogic Exercise. After one month, the subjects were tested on their Yogic exercise training. The eyesight of high school females was enhanced with the practice of yogic exercises.

Thus, the result of the study revealed that the Yogic eye exercise and trataka have a favourable influence on the improvement of eyesight in visually impaired participants. The Snellen Eye test was performed on the subjects before and after they practised trataka. The Snellen Eye test is a procedure used in clinical settings to examine patients' level of visual acuity (Tsui & Patel, 2020; Zapparoli et al., 2009). The computed mean and standard deviation values significantly influenced the selected variable (vision quality).

The current study's limitations include a limited sample size and the absence of a control group. The initial number of participants in the present study (10 patients) was insufficient to assign half of them to the control group. Additionally, they had not received any mode of therapy before their involvement in the study; thus, our findings appear to be a product of time. Aside from therapeutic ac-

tivity, the present study was strictly supervised to ensure adherence to the treatment strategy.

Conclusion

According to data taken before and after the experiment and considering the individual performance of the right eye's visual quality, 70 percent of participants exhibited a favourable effect. In comparison, 80 percent showed a positive effect on the left eye following the scheduled Trataka. These findings indicate that the calculated paired t-ratio values for the right eye are 0.669 and for the left eye 0.758, with significant values of 0.52 and 0.47, respectively, which are greater than the 0.01 level. As a result, these findings indicate no significant difference in the visual quality of the selected adolescent boys' group between pre- and post-test data. Nonetheless, a minor beneficial influence on the chosen variable (vision quality) is observed when the estimated mean and standard deviation values are considered. Still, no substantial improvement is observed when examining group data. Thus, the researcher anticipates that the given training was steered in a good direction, in this example, by increasing the number of exercises and sessions with training, which may result in a significant difference in the quality of vision for both the right and left eyes. Six of the ten ocular patients in this study showed improvement in vision quality with a mild change of dioptric power of 0.25. Two showed a significant effect on the visual quality of the left eye with a dioptric power of 0.50.

In contrast, the other two subjects showed no change. In the same way, six people had a mild difference in vision quality in the right eye, one had a significant visual quality change in the right eye, and the other three were not influenced by the given experiment. As a result, these findings indicate that Trataka yoga kriya exercises given to certain people (ocular patients) benefit their vision. We might consider this an initial step toward WHO's current global initiative program, "The Right to Sight", which emphasizes the importance of access to quality vision (Holden B.A., 2007).

Authors' contributions

Conceptualization, D.K. and P.K.; methodology, N.C.; software, V.W.; check, B.M., N.C. and V.W.; formal analysis, N.C.; investigation, P.K.; resources, D.K.; data curation, B.M.; writing – rough preparation, D.K.; writing – review and editing, B.M.; visualization, V.W.; supervision, D.K.; project administration, V.W. and D.K.; receiving funding, D.K. All authors have read and agreed with the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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