Cloistered and Coalesce Effects of Yogic Practices and Dynamic Sports Vision Training on Dynamic Visual Acuity of Netball Players

Jain Kuriakose & Mebin Joseph

Abstract

The purpose of this study was to examine the effects of yogic practices and dynamic sports vision training on the dynamic visual acuity of netball players. The participants were sixty (N = 60) boys, aged 15–17 years, who had participated in the South Zone School State Level Netball Tournament at the Kerala Sports Council Training Centre, School South Zone, Kerala, India. The participants were randomly assigned to four equal groups of fifteen: a yogic practices group, a dynamic sports vision training group, a combined yogic practices and dynamic sports vision training group, and a control group. Dynamic Visual Acuity (DVA) was selected as the dependent variable and was measured using the Dynamic Visual Acuity Test–Non-Instrumented (DVAT–NI). Pre-test and post-test data were analyzed using analysis of covariance (ANCOVA). When the adjusted post-test F-ratio was significant, Scheffé's post hoc test was used to determine significant paired mean differences. The level of significance was set at 0.05. The findings indicated significant improvements in Dynamic Visual Acuity in the experimental groups, with the combined yogic practices and dynamic sports vision training group demonstrating greater improvement than the other experimental and control groups.

Keywords: cloistered yogic practice; cloistered dynamic vision training; coalesce yogic practice and dynamic vision training; dynamic visual acuity

Introduction

Yoga is a traditional Indian discipline that combines physical postures, cleansing practices, regulated breathing, and meditation. Previous reports have associated yoga together with ocular relaxation exercises with improved visual acuity and reduced symptoms of visual fatigue. Yogic activities have also been proposed as a means of reducing ocular strain through conditioning of the extraocular muscles (Gosewade et al., 2013).

Trataka is a meditative practice included among the six purificatory practices, or shatkarmas, of Hatha yoga. The Sanskrit term "trataka" refers to looking or gazing, and the practice is based on sustained attention to a single visual target. A candle flame is commonly selected, although a dot on a wall, an object of devotion, a deity, a flower, a mountain, the rising sun, or the moon may also be used. Traditionally, the candle flame is considered an especially suitable focus (Sawant & Pradhan, 2015).

This form of meditation is traditionally associated with the ajna, or third-eye, chakra, which is linked with intuition, wisdom, and psychic abilities. It is also described as helping the practitioner develop a clearer awareness of the past, present, and future. In English, Trataka is commonly described as yogic gazing.

Competitive athletes continually seek methods that may enhance performance. Training generally gives substantial attention to physical qualities such as strength, speed, agility, and endurance. Sport-specific skill development is another important component and often depends on repeated practice and feedback to refine movement and biomechanics. Visual performance is likewise an important contributor to sporting success but is frequently given less attention.

In sport, vision supplies information that helps the performer determine what action to take, where to act, and when to respond. Delayed or inaccurate visual information can therefore interfere

with performance. Because sporting activity places considerable demands on the visual system, effective visual functioning is important for high-level performance. Assessment that combines visual function with visual information-processing ability may provide a broader picture than routine eye-health assessment alone (Loran & Griffiths, 2001).

Dynamic visual acuity (DVA) is the ability to discriminate the fine details of a moving object during relative motion between the object and the observer (Uchida et al., 2012). In fast, interactive team sports such as netball, players must track a moving ball and moving teammates and opponents while they themselves are in motion, so DVA is a particularly relevant visual quality. Earlier studies have reported that athletes recognise the gap in a moving Landolt ring at higher target velocities than non-athletes (Ishigaki & Miyao, 1993; Rouse et al., 1988). Uchida et al. (2012) further showed that the superior DVA of baseball players appeared under free-eye-movement conditions but not under fixation conditions, which suggests that it is related mainly to better tracking of moving targets with the eyes. Regular sport participation has also been linked with better-preserved DVA across the lifespan (Muiños & Ballesteros, 2015).

DVA also appears to be trainable. Long and Riggs (1991) examined training effects on DVA with free-head viewing, and Appelbaum and Erickson (2018) reviewed current approaches to sports vision training, including the research evidence supporting them. Clark et al. (2012) reported improved batting statistics in university baseball players after a programme of vision training. Most of this work, however, has been carried out with baseball players and in laboratory settings, and the evidence for team sports played by adolescents remains limited.

Eye-related yogic practices have been examined mainly in relation to visual comfort, visual function, and attention. Telles et al. (2006) studied the effect of a yoga programme that included trataka on self-rated visual discomfort in computer users, and Swathi et al. (2021) investigated the

effect of trataka on performance in a spatial memory task. The findings on refractive status are not uniform: Tiwari et al. (2018) found that neither trataka nor Bates eye exercises produced a significant change in refractive error or visual acuity in myopic participants. Whether ocular yoga practices, alone or combined with sport-specific vision training, can improve the dynamic visual acuity of young athletes has therefore not been established.

The present study was designed to address this question. It compared a yogic practices group, a dynamic sports vision training group, a combined yogic practices and dynamic sports vision training group, and a control group on the dynamic visual acuity of adolescent netball players.

Methodology

A total of sixty (N = 60) boys who had participated in the South Zone School State Level Netball Tournament at the Kerala Sports Council Training Centre, School South Zone, Kerala, India, were selected for the study. Their age ranged from 15 to 17 years. The participants were randomly divided into four equal groups of fifteen: a yogic practices group, a dynamic sports vision training group, a combined yogic practices and dynamic sports vision training group, and a control group. Before participation, the subjects were informed about the experimental procedures and provided consent. Dynamic Visual Acuity (DVA) served as the dependent variable and was assessed with the Dynamic Visual Acuity Test–Non-Instrumented (DVAT–NI). Measurements were obtained before and after the training period. The data were analyzed through analysis of covariance (ANCOVA). Where the F-ratio for the adjusted post-test means reached statistical significance, Scheffé's post hoc procedure was used to examine paired mean differences. Statistical significance was accepted at 0.05.

Analysis of the Data

Table 1 presents the ANCOVA results for Dynamic Visual Acuity (DVA) across the three experimental groups and the control group.

Table 1

Values of Analysis of Covariance for Experimental Groups and Control Group on Dynamic Visual Acuity

Test	Cloistered Yogic Practice Group	Cloistered Dynamic Vision Training Group	Coalesce Yogic Practice and Dynamic Vision Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F Ratio
Pre Test	11.38	11.45	11.35	11.46	Between	0.13	3	0.04	0.39
					Within	6.13	56	0.11	
Post Test	12.45	13.41	16.11	11.42	Between	182.52	3	60.84	237.46*
					Within	14.35	56	0.26	
Adjusted Post Test	12.46	13.40	16.12	11.41	Between	181.47	3	60.49	233.14*
					Within	14.27	55	0.26	

* Significant at .05 level of confidence

(The table value required for Significance at 0.05 level with df 3 and 56 is 2.76 & 3 and 55 is 2.77)

For Dynamic Visual Acuity (DVA), the pre-test means were 11.38, 11.45, 11.35, and 11.46 for the Cloistered Yogic Practice, Cloistered Dynamic Vision Training, Coalesce Yogic Practice and Dynamic Vision Training, and Control groups, respectively. The obtained pre-test F-ratio was 0.39, which was below the required table value of 2.76 and therefore was not statistically significant at the 0.05 level. At post-test, the corresponding means were 12.45, 13.41, 16.11, and 11.42. The post-test F-ratio was 237.46, exceeding the table value of 2.76 for df = 3 and 56, and indicating a statistically significant difference among the groups.

The adjusted post-test means for Dynamic Visual Acuity were 12.46, 13.40, 16.12, and 11.41 for the Cloistered Yogic Practice, Cloistered Dynamic Vision Training, Coalesce Yogic Practice and Dynamic Vision Training, and Control groups, respectively. The adjusted post-test F-ratio was 233.14, which exceeded the table value of 2.77 for df = 3 and 55. This result indicates a statistically significant difference at the 0.05 level.

Overall, the ANCOVA findings demonstrate a statistically significant difference among the adjusted post-test group means for Dynamic Visual Acuity.

Table 2 shows the results of Scheffé's post hoc comparisons, in which the adjusted post-test means were compared in pairs.

Table 2

The Scheffé's Test for the Differences between the Adjusted Post-test Paired Means on Dynamic Visual Acuity

Variable	Cloistered Yogic Practice Group	Cloistered Dynamic Vision Training Group	Coalesce Yogic Practice and Dynamic Vision Training Group	Control Group	Mean Difference	Confidence Interval
Dynamic Visual Acuity	12.46	13.40			0.95*	0.54
	12.46		16.12		3.66*	0.54
	12.46			11.41	1.04*	0.54
		13.40	16.12		2.72*	0.54
		13.40		11.41	1.99*	0.54
			16.12	11.41	4.71*	0.54

* Significant at .05 level of confidence

The paired adjusted post-test comparisons presented in Table 2 show differences in Dynamic Visual Acuity among the intervention groups and the control group. The comparisons also indicate differences between the individual intervention groups.

The Scheffé analysis demonstrated statistically significant differences in Dynamic Visual Acuity between the Cloistered Yogic Practice and Cloistered Dynamic Vision Training groups, between each of these intervention groups and the control group, and between the Coalesce Yogic Practice and Dynamic Vision Training group and the other groups.

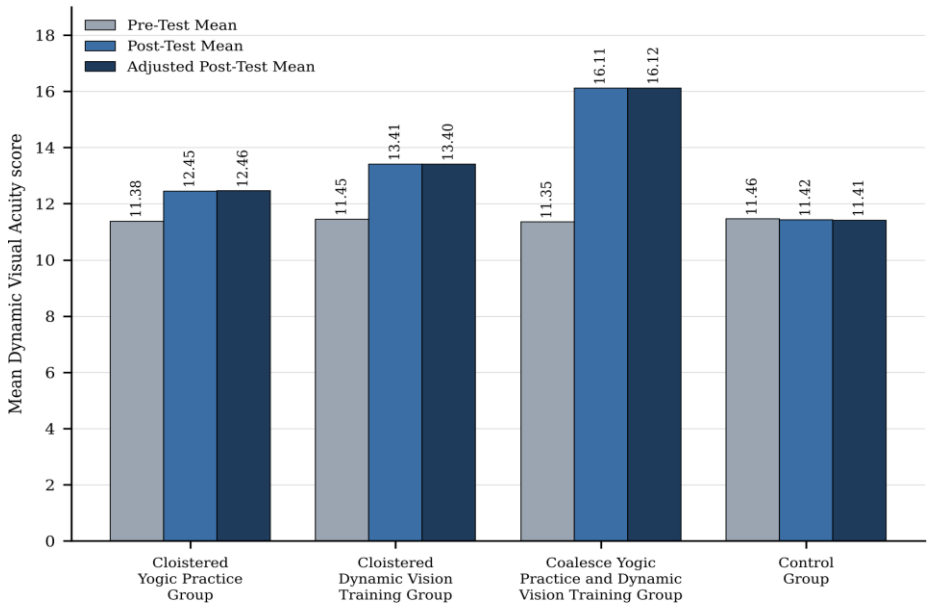
The magnitude of improvement in Dynamic Visual Acuity was greatest for the Coalesce Yogic Practice and Dynamic Vision Training group when compared with the other experimental groups.

Based on the obtained results, the Coalesce Yogic Practice and Dynamic Vision Training group produced the most favorable outcome for increasing Dynamic Visual Acuity among the groups included in the study.

Figure 1 presents the pre-test, post-test, and adjusted post-test means of the experimental and control groups on Dynamic Visual Acuity.

Figure 1

Bar Chart of the Pre-test, Post-test, and Adjusted Post-test Means of Dynamic Visual Acuity



Conclusion

- The analysis showed statistically significant differences in Dynamic Visual Acuity among the Cloistered Yogic Practice, Cloistered Dynamic Vision Training, Coalesce Yogic Practice and Dynamic Vision Training, and Control groups.
- The experimental groups demonstrated significant improvements in Dynamic Visual Acuity when compared with the control group.
- The Coalesce Yogic Practice and Dynamic Vision Training group produced higher Dynamic Visual Acuity outcomes than the Cloistered Yogic Practice, Cloistered Dynamic Vision Training, and control groups.

References

Appelbaum, L. G., & Erickson, G. (2018). Sports vision training: A review of the state-of-the-art in digital training techniques. *International Review of Sport and Exercise Psychology, 11*(1), 160–189. https://doi.org/10.1080/1750984X.2016.1266376

Clark, J. F., Ellis, J. K., Bench, J., Khoury, J., & Graman, P. (2012). High-performance vision training improves batting statistics for University of Cincinnati baseball players. *PLoS ONE, 7*(1), e29109.

Gosewade, N. B., Shende, V. S., & Kashalikar, S. J. (2013). Effect of various eye exercise techniques along with pranayama on visual reaction time: A case control study. *Journal of Clinical and Diagnostic Research, 7*(9).

Ishigaki, H., & Miyao, M. (1993). Differences in dynamic visual acuity between athletes and nonathletes. *Perceptual and Motor Skills, 77*(3), 835–839. https://doi.org/10.2466/pms.1993.77.3.835

Long, G. M., & Riggs, C. A. (1991). Training effects on dynamic visual acuity with free-head viewing. *Perception, 20*(3), 363–371.

Loran, D., & Griffiths, G. (2001). Visual performance and soccer skills in young players. *Optometry Today, 41*, 32–34.

Muiños, M., & Ballesteros, S. (2015). Sports can protect dynamic visual acuity from aging: A study with young and older judo and karate martial arts athletes. *Attention, Perception, & Psychophysics, 77*, 2061–2073.

Rouse, M. W., DeLand, P., Christian, R., & Hawley, J. (1988). A comparison study of dynamic visual acuity between athletes and nonathletes. *Journal of the American Optometric Association, 59*, 946–950.

Sawant, D. A., & Pradhan, S. D. (2015). A clinical study to evaluate the efficacy of trataka yoga kriya and eye exercises (non-pharmacological methods) in the management of timira (ametropia and presbyopia). *International Ayurvedic Medical Journal, 3*(7).

Swathi, P. S., Bhat, R., & Saoji, A. A. (2021). Effect of trataka (yogic visual concentration) on the performance in the Corsi-block tapping task: A repeated measures study. *Frontiers in Psychology, 12*, 773049. https://doi.org/10.3389/fpsyg.2021.773049

Telles, S., Naveen, K. V., Dash, M., Deginal, R., & Manjunath, N. K. (2006). Effect of yoga on self-rated visual discomfort in computer users. *Head & Face Medicine, 2*, 46.

Tiwari, K. K., Shaik, R., Aparna, B., & Brundavanam, R. (2018). A comparative study on the effects of vintage nonpharmacological techniques in reducing myopia (Bates eye exercise

therapy vs. Trataka Yoga Kriya). *International Journal of Yoga*, *11*(1), 72–76. https://doi.org/10.4103/ijoy.IJOY_59_16

Uchida, Y., Kudoh, D., Murakami, A., Honda, M., & Kitazawa, S. (2012). Origins of superior dynamic visual acuity in baseball players: Superior eye movements or superior image processing. *PLoS ONE, 7*(2), e31530. https://doi.org/10.1371/journal.pone.0031530