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## Impact of Specific Yoga Module with special reference to *Bhramari*, *Trataka* and *Jala neti* on attention among Archers

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### ABSTRACT:

**Introduction:** Attention is a complex cognitive phenomenon of selecting significant issues and disregarding those which are less significant characterizes achievement in sports, including archery. This study aimed to find out the effect of specific yoga modules with special reference to *Bhramari* Pranayama, *Trataka*, and *Jala Neti*, on attention among Archers.

**Material and methods:** An experimental-control group design with a random sampling method having inclusion criteria for the participant obtained 50 individuals ranging from 18 to 25 years of age from Bhopal; were included in the study.

**Result:** The 25 participants from the experimental group showed a high level of significance ( $p < 0.05$ ) after practicing specific yoga module with *Bhramari*, *trataka*, and *jala neti* for an hour and archery for 2 hours every day, except Sundays for 12 weeks in contrast to the control group were only yoga modules designed for the experimental group were not exposed.

**Discussion:** The study suggests that a specific yoga module with special reference to *Bhramari*, *trataka* and, *jala neti* has a positive effect on increasing the shooting score and reducing errors in the Eye-Hand Coordination Test. Yoga can be practiced in a daily routine to increase the level of attention substantially.

**Keywords:** *Bhramari*, *Pranayama*, *Trataka*, *Jala Neti*, *Attention*, *Archers*

### INTRODUCTION

Archery is a sport, which requires a significant degree of attention, physical and mental relaxation and precise shooting skills<sup>1</sup>. Literature, at worldwide setting, supports that attention; concentrations as well as the relaxed physical and mental state are the fundamental traits in a mental sport like archery<sup>2</sup>. Attention is defined as the capacity to attend to a task in hand, for a required period of time<sup>3</sup>, considered as the cognitive ability to focus on specific stimuli or area<sup>4</sup> and, there is an agreement among

researchers that attention is significant for achievement in sports<sup>5, 6</sup>. At the point when an individual is cognizant, he/she has two kinds of attention, active and passive. A voluntary process of increased alertness, concentration, and necessities of an individual is an active attention and passive attention is characterized as an involuntary cognitive process that effectively gets distracted by any outside stimuli<sup>7</sup>. Hartley & Davies (1978) opine that the attention span of an average adult on a particular topic is



for 10-20 minutes at a time and there are many factors which reduce the attention span of an individual such as, fatigue, hunger, noise, external stimuli, emotional and mental status<sup>8</sup>. Many scientific studies have proved that different types of yogic practices like asana, pranayama, and meditation are beneficial in enhancement of attention<sup>9</sup>, self-esteem<sup>10</sup>, visual and spatial memory<sup>11</sup> and effectively improves various cognitive function such as mental balance, decision making, verbal retention and recognition in healthy young subjects<sup>12, 13</sup>.

*Bhramari* Pranayama has a significant physiological impact with prolonged exhalation and short inhalation which changes the normal breathing rhythm<sup>14</sup>. In another research it shows that the practice of *Bhramari* Pranayama for 5-10 minutes induces subjective feelings of mental refreshment and blissfulness where the subjects are often believed to stay at meditative state<sup>15</sup>. Shirley Telles *et al.*, (2019) conducted a research suggesting high frequency yoga breathing may be useful in school-based practice to improve attention and reduction in anxiety<sup>16</sup>. Another research suggests that acute coordinative exercise improve attention in adolescent<sup>17</sup>, decrease heart rate<sup>18</sup>, and improves brain function<sup>19</sup> and, increases duration of attention<sup>20</sup>.

Out of six shatkarmas described in *Hatha Yoga Pradipika* (H.P)<sup>21</sup> and *Gheranda Samhita* (G.S)<sup>22</sup>, *Neti* eradicates *Kaphaja* disorders and improves vision and *Trataka* helps to improve eyesight with a significant effect on neuropsychological functions like myopia<sup>23</sup>. Talwadkar *et al.*, (2014) conducted a study, shows that the practice of *Trataka* had significant impact on improved attention, concentration and executive functions in healthy elderly subjects<sup>24</sup>. Raghavendra & Singh, (2016) suggest that yogic visual concentration (*trataka*) technique increases the selective attention, cognitive flexibility, and response inhibition in healthy male participants<sup>25</sup>. Therefore, it has been suggested on the research reviews that to find the impact on Archers; *Bhramari* pranayama, *Trataka* and *Neti* can have substantial impact on dependent variable. Hence, the objective of the study was to find out the effect of specific yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on the efficacy of archers to increase the shooting scores by hitting the targets successfully, and (b) To find out the effect of specific yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on selected psychological variables of attention among the Archers.

## MATERIAL AND METHODS

**Selection of Subjects:** For the present investigation fifty Archers were selected randomly from Bhopal Nobel College, Udaipur with age ranging from 18-25 years. All the subjects were assigned either to experimental group or control group; each group consists of 25 subjects each. In total 12 weeks practice of Yoga Module was given for an hour per day (6 days in a week under guidance of a yoga instructor and 7th day as self-practice) to the experimental group along with the regular practice of archery. However, regular practice of archery was only given to the subjects of control group for 2 hours daily.

**Research Design:** A pretest-posttest randomized experimental design was chosen to see the effect of yoga module in the randomized study for participant's group. The subject chosen for this study were divided into two groups at random.

**Criterion of Measures:** Psychological variables of Attention by

- a) Shooting Score
- b) Eye Hand Coordination Test

### Table 1: Training schedule for Experimental Group Procedure of application:

**A. Archery Shooting Test:** Archery shooting test is used to measure the increase in the accuracy of shooting of targets by increase in number of hits. Each participant has been given 6 arrows to hit a round Metric Target with five scoring zone (GNAS imperial) divided into six colours i.e., Golden, Yellow (in the middle), Red, Blue, Black and white at the periphery. 09 Points are allocated for Golden Yellow, 07 points for Red, 05 points for Blue, 03 points for Black, 01 point for white and will be marked as 0 (missed) if arrow misses all the colours, as per the figure given in Fig.1. There were 3 targets at distance of 18 meters (Target-1), 20 meters (Target-2) and 25 meters (Target-3). Participants have been given 5 minutes to shoot six arrows to each target. Initially, participants have been asked to hit six arrows to target 1 (at a distance of 18 meters). After six hits, score has been taken accordingly on scorecard. Further, same practice has been repeated for Target 2 (at a distance of 22 meters) and Target 3 (at a distance of 25 meters). Score points has been allotted as per the above figure.

### B. Mirror tracing apparatus

This is an instrument to read coordination between eyes and hands. This coordination is a resultant of concentration, attention and focused state of an individual.

Therefore, the increase and decrease of coordination will depict the relative increase & decrease in the level of Attention & Concentration level of Archers.

This test is to measure an Archer’s ability for coordination of eyes and hand simultaneously in terms of a single task. Here is a zigzag pathway appearing on a mirror and the stylus has to be moved on that pathway according to the image of the pathway on the mirror. Any dis-orientation between eyes and hands will create countable errors. The performance in terms of time and error is accessed. Here decrease in time and error count will justify the increase in attention and concentration level of Archers by improvement in psychomotor coordination.

The subjects were asked to hold the stylus and to place into metal made Star shaped pathway. Now stylus has to be moved along the Star mark within 2 minutes.

## RESULTS

**Computational Analysis of t-test:** The data obtained were analyzed by using independent t-test to assess the significant difference among both the groups between the pretest and posttest to find out the effect of specific yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on attention level of Archers. The t-ratio obtained by t-test was significant at 0.05. The following tables illustrate the statistical results of the effect of specific Yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on attention level of Archers within two groups namely the control and experimental. The significant differences between these two groups are given below:

Table 2: Mean, Standard Deviation and mean difference of the groups and the t-test of the control group and the experimental group for shooting score

Pie chart 1: Pie chart showing the post-test means of control and experimental group for shooting score in percentage.

This shows that the pretest means of control group and experimental group were 66.72 and 69.56 and standard deviation 6.00 and 7.70 respectively; showing the group were equal at the start of the intervention. However, posttest means of the control group and the experimental group were 78.80 and 102.88 with standard deviation 6.714 and 7.372 and mean difference 12.08 and 33.32 respectively; showing the effect of Yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on shooting score of Archers. The between group

statistics shows (Table 2) that, the pretest mean and the posttest mean of the experimental group were 69.56 and 102.88, standard deviation as 7.70 and 7.37 with mean difference of 12.08 and 33.32 respectively showing the substantial effect of Yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on dependent variables.

The obtained t- value 8.30 of the experimental group with respect to the Shooting Scores was significantly higher than the required t-value (5.307). Hence, it is proven that there is a significant increase in the Shooting Scores of the experimental group. The obtained values in pre-test and post-test of control group and the experimental group are represented below through bar diagram for better understanding of the results.

Table 3: Mean, Standard Deviation and mean difference of the groups and the t-test of the control group and the experimental group for decrease of errors with eye hand coordination test

Pie chart 2: Pie chart showing the post-test mean of control and experimental group for decrease of errors with eye hand coordination in percentage.

This shows that the pretest means of control group and the experimental group was 29.84 and 30.76, standard deviation as 5.209 and 5.494 respectively; showing the group were equal at the start of the intervention. However, posttest means of control group and experimental group were 23.64 and 18.72 with standard deviation of 4.906 and 4.306 and mean difference of 06.20 and 12.04 respectively; showing the effect of Yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on attention level of Archers. The between group statistics show (table 3) that, the pretest and posttest mean of experimental group were 30.76 and 18.72 with a standard deviation 5.494 and 4.306 and mean difference of 06.20 and 12.04 respectively showing the substantial effect of Yoga module with special reference to *Bhramari* Pranayama, *Trataka* and *Jala neti* on dependent variables.

The obtained t-value 7.192 of the experimental group with respect to errors with Eye Hand Coordination Test was significantly higher than the required t-value (3.571). Hence, it is proven that there is a significant decrease of errors with Eye Hand Coordination Test of the experimental group. The obtained mean values in pretest and posttest values of control group and the experimental group are represented through bar diagram figure for better

understanding of the results.

## DISCUSSION

The present study was conducted to see the effect of specific yoga modules with special reference to *Bhramari* pranayama, *Trataka*, and *Jala neti* on the attention level of archers. In the experimental group, the archers' shooting scores significantly increased, and errors of eye-hand coordination were significantly decreased. This suggests that a specific yoga module correlates with an increase in attention among archers. The shooting score was statistically significantly higher in the experimental group than those in the control group. Because of this result, it was determined that archers who take part in the control group show significant increases in shooting scores, but not higher than the experimental group. Eye-Hand Coordination Test is known to be a more reliable measure of attention<sup>26</sup>. The result from this test showed that there was a significant difference between the experimental group and the control group. In sum, both the group show increase in the attention level but participants in the experimental group showed a significant increase in attention level as compared to the control group. The finding of this study is consistent with some of the previous literature regarding the relationship between yoga and attention. A study advocates that meditation and yoga-based relaxation techniques significantly improve attention; the current study's finding supported these proclamations as the experimental group exhibit increased attention scores after practicing the yoga module<sup>27</sup>. Another study showed that cyclic meditation (CM) and supine rest (SR) immediately improve the level of attention in children; in this study, the researcher using the six-letter cancellation task (SLCT) for attention<sup>28</sup>. In this study, the Eye-Hand Coordination Test was employed. Physical exercise and meditation have been shown to increase attention<sup>29, 30</sup>. In this study, the control group also shows an increase in the attention level due to physical activity and the practice of shooting. Whereas, in the experimental group, the significant improvement shows in attention level because of the combination of *Shatkarmas*, physical aspects, and meditative components in yoga. Other studies suggest additional factors may also contribute to improved attention. A study suggested that arduous activity increases the heart rate which may contribute to a greater increase in attention; which supports this study that, the control group practicing shooting for two hour shows to increase attention level<sup>17</sup>. While breathing exercise is known to

increase parasympathetic activity<sup>31</sup> and positive effect on resting heart rate<sup>32</sup>. Similarly, *Bhramari* pranayama in this study has been reported to produce parasympathetic arousal<sup>33</sup>. This is associated with the state of high attention<sup>34</sup>. The technique of *Trataka* is also regarded as ( *jyoti dhyan*)<sup>35</sup> meditations as it could induce a calm state of mind which leads to increase vagal tone and reduced sympathetic activity<sup>36</sup> thus, helps to improve attention. *Jala neti* is used to removing excess mucus and pollutant from the nasal section, permitting air to flow without obstruction<sup>37</sup>, and had a positive effect on cognitive functions like concentration and attention, and helps relieve stress and anxiety<sup>38</sup>.

## CONCLUSION

The Attention level in Archers was significantly increased after the twelve weeks of specific Yoga modules practice with special reference to *Bhramari* Pranayama, *Trataka*, and *Jala neti* in the experimental group as compared to the control group. Thus, yoga can be practiced in a daily routine to increase the level of attention substantially.

**Implication for future research:** There are many directional possibilities in which this research could be taken. A similar study may be conducted for various age groups to see the effect of yogic practices on the attention level of different age groups. The Yogic practices can be compared to other types of sports to find the effectiveness of dependent variables. A similar study can also be conducted for people suffering from attention related disorders. Schools and colleges could also use these findings to create programs for students to enhance their attention. Counselling and learning help center also use these findings to support their implementation and recommended curriculum to help students.

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**Table 1: Training schedule for Experimental Group**

S. No.	Name of practices	Duration (Minutes)
1	<i>Jala neti</i> kriya by both the nostrils followed by Makarasna (Mon, Wed and Fri only)	20
2	Loosening Exercises (SukshmaVyayama)	10 min (5x2)
	Skandha Shakti Vikasaka Kriya	2
	Madibandh Shakti Vikasaka Kriya	2
	Karaprishtha / Shakti Vikasaka Kriya	2
	Angul Shakti Vikasaka Kriya	2
	Netra Shakti Vikasaka Kriya	2
3	Basic Asanas	10 min (5x2)
	Katichakrasana (Twisting by both sides)	2
	Natarajasana (Balancing Pose by both the legs)	2
	Paschimottasana (Forward Bending)	2
	Dhanurasana (Backward Bending)	2
	Vajrasana (Meditative Pose)	2
4	<i>Bhramari</i> Pranayama	20
5	<i>Trataka</i> (Tue, Thu, Sat only)	20

**Table 2: Mean, Standard Deviation and mean difference of the groups and the t-test of the control group and the experimental group for shooting score**

Group	Test	Mean	S.D. (Standard Deviation)	M.D. (Mean Difference)	r (Correlation)	t-value
Control	Pre-test	66.72	6.0036	12.08	0.7675	3.45
	Post-test	78.8	6.7144			
Experimental	Pre-test	69.56	7.7032	33.32	0.8162	8.3
	Post-test	102.88	7.3729			

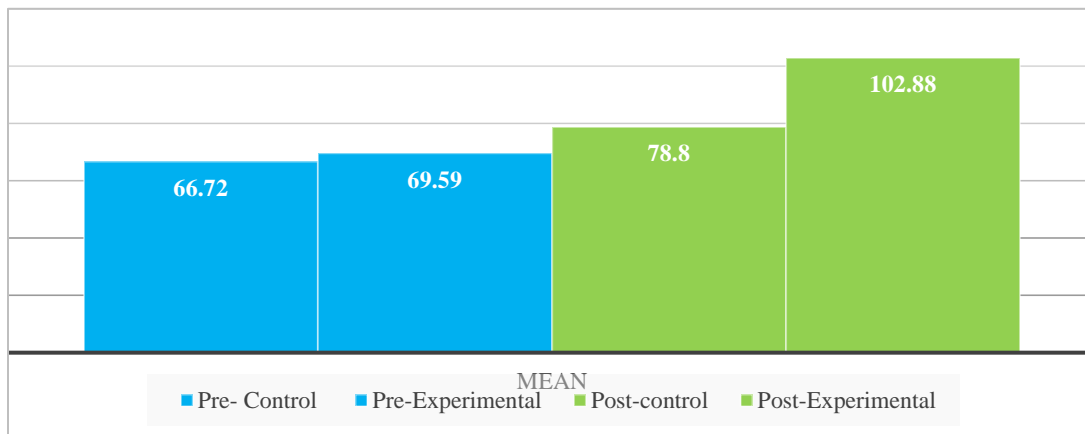
8.30 shows significant t-ratio at 0.05 level of confidence for the degree of freedom (df) at 49=1.857; where n=50

**Table 3: Mean, Standard Deviation and mean difference of the groups and the t-test of the control group and the experimental group for decrease of errors with eye hand coordination test**

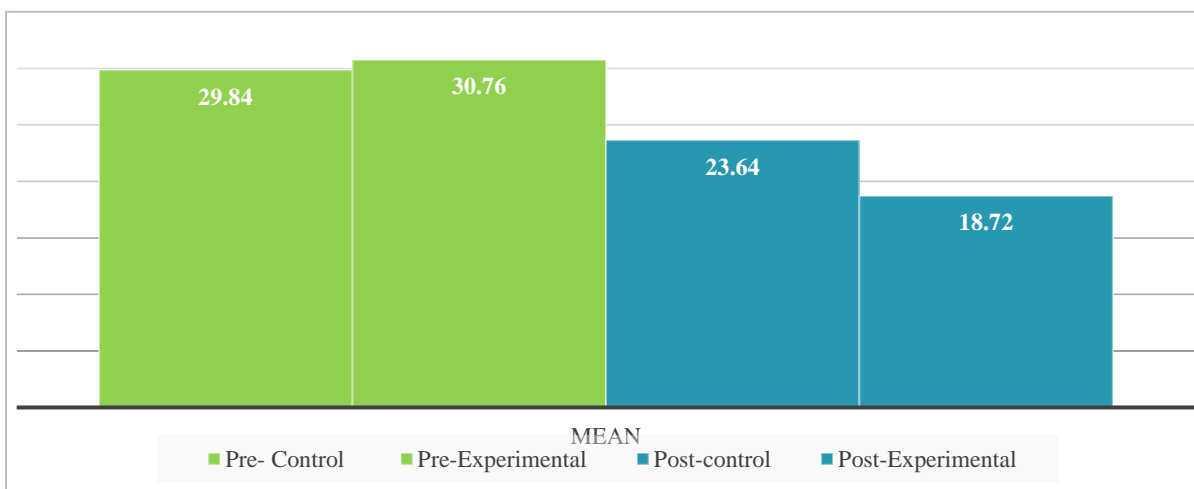
Group	Test	Mean	S.D. (Standard Deviation)	M.D. (Mean Difference)	r (Correlation)	t-value
Control	Pre-test	29.84	5.209	6.2	6.001	2.037
	Post-test	23.64	4.906			
Experimental	Pre-test	30.76	5.494	12.04	0.96	7.192
	Post-test	18.72	4.306			

7.192 shows significant t-ratio at 0.05 level of confidence for the degree of freedom (df) at  $t_{49} = 1.534$ ; where  $n=50$

**Graph 1: Histogram showing pre-test and post-test mean of control group and experimental group for shooting score**

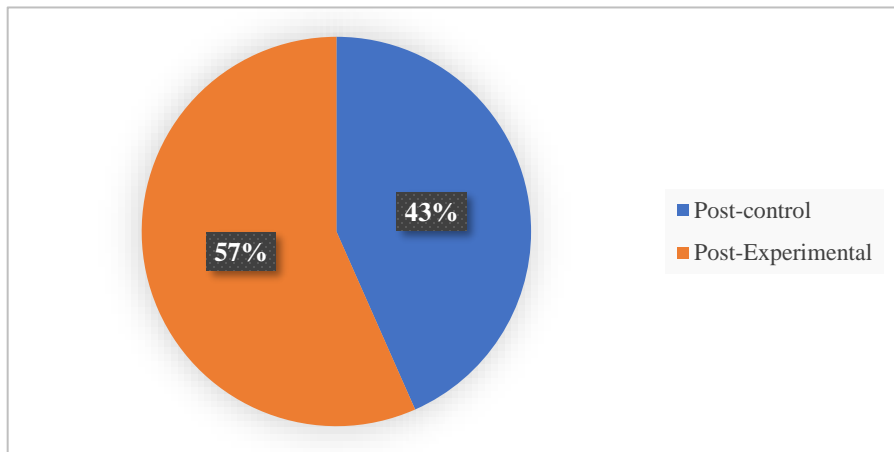


**Graph 2: Histogram showing pre-test and post-test mean of control group and experimental group for decrease of errors with eye hand coordination.**





**Pie chart 1: Pie chart showing the post-test means of control and experimental group for shooting score in percentage.**



**Pie chart 2: Pie chart showing the post-test mean of control and experimental group for decrease of errors with eye hand coordination in percentage.**

