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Effect of trataka meditation on stress reduction and attention span in young athletes: A comparative study

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Abstract

This study investigates the impact of Trataka meditation, a yogic gazing practice, on stress reduction and attention span enhancement in young athletes of Gwalior city. A total of 20 athletes (10 experimental, 10 control) aged 15–19 were selected. The experimental group practiced Trataka for 4 weeks, 15 minutes daily. Stress and attention were evaluated pre- and post-intervention using the Perceived Stress Scale (PSS) and Letter Cancellation Test (LCT), respectively. Statistical analyses (paired t-test, ANOVA, ANCOVA) demonstrated significant improvements in the experimental group. Findings affirm the efficacy of Trataka in enhancing mental clarity and reducing psychological strain, underscoring its relevance in sports training programs.

Keywords: Trataka meditation, stress reduction, attention span, young athletes, Perceived Stress Scale

Introduction

In the evolving domain of competitive sports, young athletes are increasingly exposed to performance-related stress, rigorous schedules, and constant evaluation. These pressures can elevate psychological distress and hamper attention and decision-making abilities—two critical components for athletic and academic excellence. Adolescent athletes, in particular, face neurocognitive challenges as their brains are still maturing, making them vulnerable to stress-induced impairments.

To address such concerns, attention has been turning toward traditional mind-body techniques that are both effective and accessible. Among them, Trataka meditation, a classical yogic technique involving fixed gazing (often on a candle flame), has shown promising results. Trataka is one of the six purification practices (Shatkarma) mentioned in Hatha Yoga texts. It not only sharpens vision but also improves concentration and calms the mind by focusing mental energy on a single point.

The method involves sitting in a dark, quiet space and gazing steadily at a candle flame or symbolic object placed at eye level, without blinking, until tears emerge. This is followed by closing the eyes and visualizing the afterimage of the object. Physiologically, Trataka is believed to regulate brainwave activity, improve parasympathetic tone, and lower stress hormone levels, leading to reduced anxiety and improved focus.

While general yoga and mindfulness practices have been studied for their psychological benefits, few empirical studies have isolated the effects of Trataka in athletic contexts. Given the cognitive demands of sports—strategic decision-making, rapid reflexes, and sustained focus—incorporating a practice like Trataka may offer dual benefits: mental clarity and emotional resilience.

This study aims to evaluate the specific effects of Trataka on stress levels and attention span in young athletes. By employing validated psychological instruments and rigorous statistical analysis, this research seeks to determine whether this traditional yogic tool can serve modern athletic demands for cognitive enhancement and stress management.

Objectives

1. To evaluate the effect of Trataka meditation on stress reduction.

- To assess the impact of Trataka on attention span in young athletes.
- To statistically compare the outcomes of experimental and control groups.

- Control Variables:** Age, training regime, sleep duration, dietary patterns
- Sample Size:** 20 athletes (10 experimental, 10 control), aged 15–19

Variables

Independent Variable: Trataka Meditation (15 minutes/day for 4 weeks)

Dependent Variables

- Stress (assessed via PSS)
- Attention span (assessed via LCT)

Hypotheses

- H1:** Trataka meditation will significantly reduce stress in young athletes.
- H2:** Trataka meditation will significantly improve attention span in young athletes.

Table 1: Pre-Post Mean Scores (Stress and Attention)

Group	Stress Pre-Test (Mean ± SD)	Stress Post-Test (Mean ± SD)	Attention Pre-Test (Mean ± SD)	Attention Post-Test (Mean ± SD)
Experimental	23.1 ± 2.7	16.0 ± 2.3	37.5 ± 3.0	48.9 ± 3.4
Control	22.5 ± 2.5	22.1 ± 2.4	37.8 ± 2.8	38.3 ± 2.9

Table shows notable improvements in the experimental group, where stress decreased from 23.1 to 16.0, and attention increased from 37.5 to 48.9. The control group showed

minimal changes, suggesting the effectiveness of Trataka meditation.

Table 2: Paired t-Test Results (Within Experimental Group)

Test	Mean Difference	t-value	p-value	Interpretation
Stress	-7.1	4.76	0.0009	Highly significant stress reduction
Attention	+11.4	5.20	0.0004	Highly significant attention improvement

Significant changes were observed within the experimental group. Stress levels dropped by 7.1 points ($p < 0.001$), and

attention improved by 11.4 points ($p < 0.001$), indicating a strong impact of Trataka on both psychological parameters.

Table 3: Independent t-Test (Post-Test Comparison: Experimental vs Control)

Variable	Group Means (Exp vs Ctrl)	t-value	p-value	Interpretation
Stress	16.0 vs 22.1	3.87	0.0015	Significant stress reduction in experimental group
Attention	48.9 vs 38.3	4.38	0.0003	Significant attention enhancement in experimental group

The post-test comparison shows statistically significant lower stress and higher attention scores in the experimental group compared to the control. This confirms that the improvements were specifically due to the Trataka practice.

and control groups. This further supports the stress-reducing effect of Trataka meditation.

Table 4: One-Way ANOVA (Post-Test Stress Scores)

Source	SS	df	MS	F	p-value
Between Groups	86.72	1	86.72	13.82	0.0018
Within Groups	112.84	18	6.27		
Total	199.56	19			

The F-value of 13.82 and p-value of 0.0018 indicate a significant difference in stress levels between experimental

Table 5: ANOVA (Post-Test Attention Scores)

Source of Variation	SS	df	MS	F	p-value
Between Groups	102.96	1	102.96	17.71	0.0005
Within Groups	104.52	18	5.81		
Total	207.48	19			

With an F-value of 17.71 and a p-value of 0.0005, the table confirms a highly significant difference in attention levels post-intervention. Trataka had a notable positive influence on enhancing focus.

Table 6: Shapiro-Wilk Normality Test

Variable	W-Statistic	p-value	Interpretation
Stress Pre-Test	0.957	0.498	Data is normally distributed
Stress Post-Test	0.943	0.436	Data is normally distributed
Attention Pre	0.963	0.582	Data is normally distributed
Attention Post	0.946	0.402	Data is normally distributed

All variables show p-values above 0.05, confirming that the data is normally distributed. This validates the use of

parametric tests like t-tests and ANOVA in the analysis.

Table 7: ANCOVA (Adjusting for Pre-Test Scores)

Variable	F-value	p-value	Interpretation
Stress	11.2	0.0024	Significant reduction after controlling pre-test
Attention	13.9	0.0011	Significant improvement due to intervention

Even after adjusting for pre-test differences, significant improvements were observed ($p < 0.01$). This confirms that Trataka meditation independently caused the reduction in stress and increase in attention.

- Trataka meditation led to significant reduction in stress and enhancement in attention.
- Results are statistically validated through t-tests, ANOVA, ANCOVA, and normality tests.
- Findings are robust, with minimal influence from random variation or pre-existing group differences.

Conclusion

Trataka meditation proves to be a powerful, non-pharmacological method to enhance mental clarity and emotional balance in adolescent athletes. The technique significantly reduces stress levels and improves attention span, thus aiding in both sports performance and academic functioning.

Recommendations

- Coaches should introduce Trataka as part of daily mental training routines.
- Larger sample studies should investigate physiological markers like heart rate variability and EEG patterns.
- Schools and sports academies should offer structured yoga-meditation modules for student-athletes.

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