

## Therapeutic Effects of Shirodhara on State Anxiety and Concentration in Cricket Players: A Parallel-Group Randomized Study

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### ABSTRACT

**Purpose:** This study evaluated the efficacy of Shirodhara, a traditional Panchakarma therapeutic technique, as a non-pharmacological intervention for reducing competitive anxiety and enhancing cognitive performance in athlete populations.

**Methods:** A parallel-group randomized controlled trial was conducted with 60 male cricket players (aged 17–27 years) from Banaras Hindu University. Participants were randomly assigned to an experimental group (n=30) receiving standardized Shirodhara treatment consisting of warm medicated (Medhya kashaye Kwath) applied to the forehead for 40 minutes daily over seven consecutive days, and a control group (n=30) continuing cricket routine training. State anxiety was assessed using the Sport Competition Anxiety Test (SCAT), concentration was measured with the Six Letter Cancellation Task (SLCT), 15 days post-intervention.

**Results:** The experimental group demonstrated a significant reduction in state anxiety (mean difference  $-7.2$  points on SCAT), improved concentration scores on the SLCT ( $+4.20$  points), the control group showed negligible changes across all measures.

**Conclusions:** Shirodhara demonstrates significant therapeutic potential as a non-pharmacological intervention for reducing competitive anxiety and enhancing cognitive performance in athletes. The integration of Ayurvedic practices with sports psychology presents a feasible and culturally appropriate complementary mental conditioning approach for competitive athletes.

**Keywords:** Shirodhara, state anxiety, cognitive performance, cricket athletes, Shirodhara intervention

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### 1. INTRODUCTION

#### 1.1 Background and Clinical Significance

In the face of severe physiological and psychological stress, competitive athletics require concentration, quick decision-making, and efficient emotional management. These difficult cognitive-emotional requirements are best shown by the complicated sport of cricket, which calls for sustained attention, strategic decision-making, and composed performance in high-pressure competition settings. Maintaining both physical strength and psychological stability is essential for elite cricket players, especially in match conditions where emotional balance and millisecond decision-making influence competitive outcomes. State anxiety is a common psychological barrier that seriously impairs athletic performance. It is defined as a fleeting emotional state marked by subjective sensations of trepidation, worry, and related physiological stimulation. Anxiety-related cognitive interference has been repeatedly shown to impair motor execution, decrease consistency under competitive pressure, and slow down decision-making speed and accuracy

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#### 1.2 Current Approaches and Identified Limitations

Pharmacological therapies, performance-based psychological skills training, and cognitive-behavioral therapy are the main strategies used today to manage athletes' competitive anxiety. Although these interventions show promise in controlled research settings, they have a number of practical drawbacks, including: (1) limited accessibility necessitating specialized practitioners; (2) possible side effects related to pharmaceutical agents; (3) prolonged training periods that clash with the demands of the competitive season; and (4) inconsistent efficacy among individual athletes. These restrictions have prompted research into alternate therapeutic approaches, especially conventional medical procedures that show some promise in improving concentration performance and lowering psychological discomfort.

#### 1.3 Shirodhara as a Potential Non-Pharmacological Intervention

In traditional Ayurvedic medicine, shirodhara is a well-known therapeutic technique that involves applying

heated medication (Kwath) to the forehead area in a continuous, rhythmic manner. This age-old technique has been used therapeutically to promote relaxation, reduce stress, and improve mental clarity. It is recorded in classical Ayurvedic literature that date back thousands of years. The hypothesized mechanisms of action include: (1) direct sensory stimulation to modulate limbic system activity; (2) autonomic nervous system function regulation; and (3) enhancement of parasympathetic tone—physiological states that promote reduced anxiety and concentration. The parasympathetic nervous system is thought to be activated by the rhythmic sensory input from continual medicated (Kwath) application, which lessens the sympathetic dominance that characterizes anxiety states. It would be anticipated that increased parasympathetic activation would result in quantifiable gains in neurophysiological indicators (processing speed) and psychological measures (decrease of anxiety). However, there hasn't been any systematic scientific research done on Shirodhara's benefits on state anxiety and concentration in athlete groups, despite its historical use and clinical anecdotal reports.

#### 1.4 Research Rationale and Objectives

This study was created to systematically assess Shirodhara's therapeutic efficacy in lowering state anxiety and improving concentration in competitive cricket players, given the prevalence of anxiety and concentration issues in competitive sports, the potential accessibility of Shirodhara as a non-pharmacological, non-invasive intervention, and the relative lack of rigorous empirical investigation into its effects on athletic populations.

## 2. METHODOLOGY

### 2.1 Research Design and Ethical Approval

In order to objectively assess Shirodhara's effects on state anxiety and concentration in cricket players, this study used an experimental, parallel-group, pre-post-intervention randomized controlled design. By maintaining a contemporaneous control group that did not receive any active intervention, the design provided rigorous control for temporal effects, practice effects, and natural psychological variation. It included two independent groups (experimental and control), baseline assessment prior to the start of the intervention, intervention delivery to the experimental group alone, and post-intervention assessment of both groups. Because it removes confounding variables such as baseline variations in anxiety or focus and guarantees that observed post-intervention changes may be directly attributed to the Shirodhara intervention rather than non-specific factors, the double-group design was chosen. The design offers unbiased, transparent comparisons between intervention and control conditions while avoiding crossover effects that might taint results.

Prior to participant recruitment, the Banaras Hindu University (BHU) Institutional Ethics Committee approved the study.

### 2.2 Participant Population and Sampling

The study population comprised male cricket players from Banaras Hindu University (BHU), Varanasi, India, who were actively engaged in competitive university-level cricket. The target population was selected based on: (1) official registration as members of the BHU cricket team, (2) active participation in inter-university cricket tournaments during the preceding three-year period, (3) male gender, and (4) age range of 17–27 years, corresponding to peak periods of physical and cognitive capacity in young adults.

To maintain homogeneity and reduce selection bias, participants were chosen using randomized sampling approaches. After participants fulfilled the inclusion criteria, random allocation was carried out to guarantee that each eligible participant had an equal chance of being assigned to either the experimental or control condition. The experimental and control groups were guaranteed to be similar at baseline in terms of training background, competitive experience, and cricketing competence thanks to this randomization technique.

**Sample Size:** The final sample comprised 60 cricket players equally divided between experimental (n=30) and control (n=30) groups. All participants were within the age range of 17–27 years and possessed minimum three years of competitive cricket experience, ensuring adequate exposure to match-related psychological demands and performance pressures. Age distribution, playing experience, competitive level, and relevant demographic variables were comparable between groups at baseline.

**Inclusion Criteria:** - Male cricket players of Banaras Hindu University - Age 17–27 years - Participation in inter-university cricket tournaments in preceding three years - Willingness to provide informed consent

**Exclusion Criteria:** - History of neurological disorders - Current participation in psychological or Panchakarma treatment - Medical contraindications to Shirodhara (skin allergies, hypersensitivity to oils, cardiovascular pathology)

### 2.3 Independent Variable: Shirodhara Intervention Protocol

The independent variable was standardized Shirodhara intervention delivered according to established Ayurvedic protocols with three distinct phases: Purvakarma (preparatory phase), Pradhana Karma (main procedure), and Paschat Karma (post-procedure care).

**Intervention Specifications:** - **Medication:** Medhya kashaye Kwath (medicated herbal decoction) prepared per Ayurvedic pharmacopeial standards - **Customization:** Kwath selection individualized based on participant body constitution (Prakriti) - **Volume:** 2 liters per session - **Temperature:** 37–40°C (lukewarm)

- **Duration:**40 minutes per session - **Frequency:** Once daily for seven consecutive days - **Application Height:** 4 angul (approximately 4-6 inches) from forehead - **Procedure:** Continuous, rhythmic pouring to create steady meditative stream - **Post-session Care:** 1-hour rest period, lukewarm water shower, avoidance of environmental extremes

#### 2.4 Dependent Variables and Assessment Instruments

Two dependent variables were measured to comprehensively assess intervention effects on psychological and cognitive.

##### 2.4.1 State Anxiety: Sport Competition Anxiety Test (SCAT)

State anxiety was measured using the Sport Competition Anxiety Test, a 15-item questionnaire specifically designed to assess competitive anxiety in athletes. The SCAT utilizes a 0–3 Likert scale and comprehensively evaluates cognitive, somatic, and emotional components of anxiety in competitive situations. Total scores range from 0–45, with higher scores indicating greater competitive anxiety. The instrument has demonstrated substantial reliability (Cronbach’s  $\alpha = 0.82$ ) and validity in athlete populations, making it particularly appropriate for evaluating anxiety changes in competitive sports contexts.

##### 2.4.2 Cognitive Concentration: Six Letter Cancellation Task (SLCT)

Concentration and attentional control were objectively measured using the Six Letter Cancellation Task, developed by Kumar and Telles (2009), providing quantitative assessment of sustained attention and processing efficiency. Participants were presented with a 14×22 letter grid and required to identify and cancel six target letters within a 90-second time constraint. The SLCT net score was calculated as: Net Score = Total Letters Correctly Cancelled – Errors (incorrectly marked letters). This metric reflects both quantity and quality of attentional focus and is sensitive to improvements in sustained attention and concentration ability. The SLCT has demonstrated good reliability (Cronbach’s  $\alpha = 0.78$ ) with parallel versions employed at pre- and post-assessment to minimize practice effects.

#### 2.5 Study Procedure and Timeline

Data collection followed a structured protocol across a 15-day study period:

Day 0 (Baseline Assessment): All participants completed pre-intervention assessments including SCAT administration and SLCT completion.

Days 1–7 (Intervention Phase): The experimental group received daily Shirodhara treatment (40 minutes per session) according to standardized protocol. The control group continued regular cricket training and daily activities without receiving any experimental intervention.

Day 15 (Post-Intervention Assessment): Both experimental and control groups underwent identical post-assessment procedures using parallel task versions to minimize practice and familiarity effects.

#### 2.6 Data Management

Post-assessment data were tabulated and coded for statistical analysis using Excel and SPSS software. Missing data points were addressed using Last Observation Carried Forward (LOCF) for continuous measures and mean imputation for variables where appropriate, following standard statistical practices.

#### 2.7 Statistical Analysis

**Descriptive Statistics:** Descriptive measures including means, standard deviations, and percentage change scores were calculated for all variables to summarize pre and post-intervention data and characterize overall trends.

**Inferential Statistics:** Paired t-tests were employed to assess within-group changes from pre- to post-intervention for both groups, examining whether statistically significant changes occurred in SCAT scores and SLCT performance. Independent t-tests compared post-intervention outcomes between groups. ANCOVA was implemented to compare post-intervention outcomes while statistically controlling for baseline differences. Effect sizes (Cohen’s  $d$ ) were calculated for all major comparisons using the formula:  $d = (M_1 - M_2) / SD$  pooled. Statistical significance was established at  $\alpha = 0.05$  (two-tailed), and 95% confidence intervals were calculated for all effect estimates. Statistical analysis was conducted using SPSS software.

### 3. RESULTS

**Table 1: Primary Outcome 1: State Anxiety (SCAT)**

Group	N	Pre-intervention Mean $\pm$ SD	Post-intervention Mean $\pm$ SD	Mean Difference
Experimental Group	30	22.5 $\pm$ 3.2	15.3 $\pm$ 2.8	-7.2
Control Group	30	22.1 $\pm$ 3.1	21.8 $\pm$ 3.0	-0.3

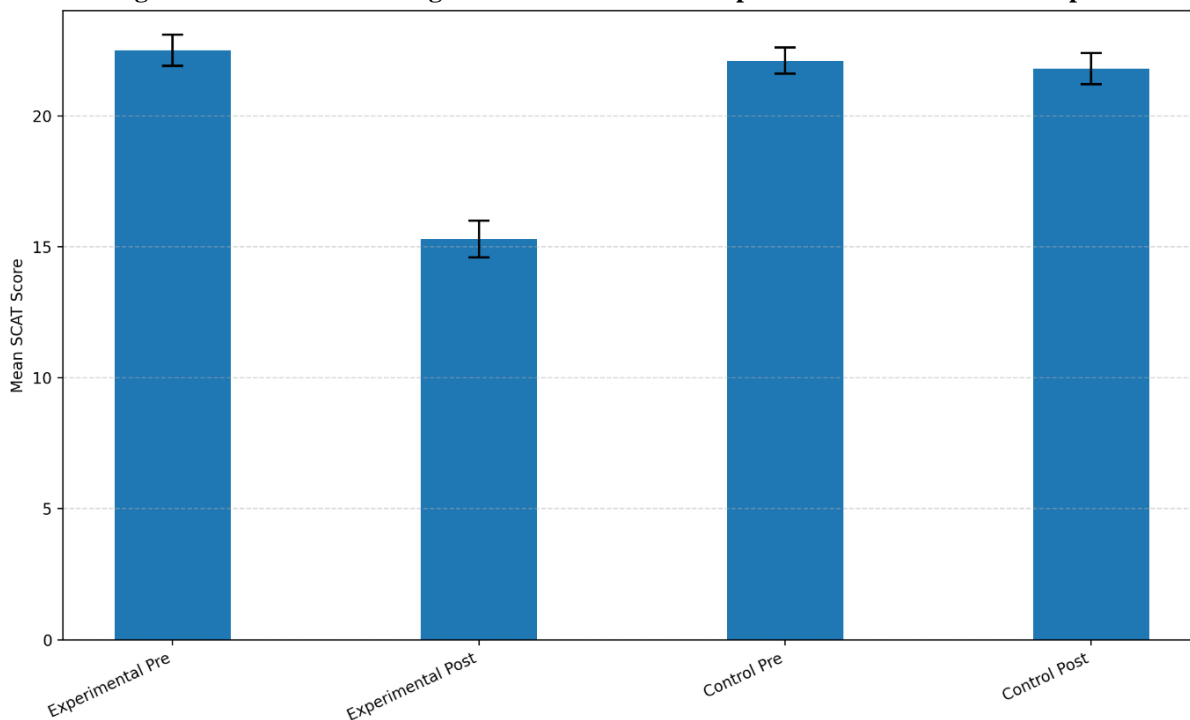
Table 1 revealed that in the experimental group, the mean pre-intervention SCAT score was  $22.5 \pm 3.2$ , indicating a relatively high level of competitive anxiety at baseline. Following the administration of Shirodhara therapy, the post-intervention mean score decreased to  $15.3 \pm 2.8$ , demonstrating a substantial reduction in anxiety levels. The mean difference of  $-7.2$  reflects a marked decline in competitive anxiety after the intervention. Additionally, the slight reduction in standard deviation indicates improved consistency in anxiety scores among participants in the post-intervention phase.

In the control group, the mean pre-intervention SCAT score was  $22.1 \pm 3.1$ , which was comparable to that of the experimental group, indicating baseline homogeneity. The post-intervention mean score was

$21.8 \pm 3.0$ , showing only a marginal reduction. The mean difference of  $-0.3$  suggests that there was no meaningful change in competitive anxiety among participants who did not receive the intervention. The standard deviation remained nearly unchanged, indicating stability in anxiety levels within the control group over time.

The descriptive findings clearly demonstrate that the experimental group experienced a substantial reduction in competitive anxiety following the Shirodhara intervention, whereas the control group showed negligible change. This indicates that the observed improvement in anxiety levels is likely attributable to the intervention rather than routine training or external factors.

**Figure 1: Bar Chart Showing Mean SCAT Scores in Experimental and Control Groups**



**Experimental Group**

In the figure 1 the bar chart demonstrates a pronounced reduction in mean SCAT scores from pre-intervention to post-intervention in the experimental group. The post-intervention bar is considerably lower than the pre-intervention bar, indicating a substantial decline in competitive anxiety following the Shirodhara intervention. The magnitude of reduction suggests a clinically meaningful improvement in emotional regulation and reduction in competition-related stress among cricket players.

**Control Group**

In contrast, the control group shows only a slight decrease between pre-intervention and post-intervention scores. The bars appear nearly equal in

height, reflecting minimal change in anxiety levels. This indicates that routine cricket training alone did not produce a significant reduction in competitive anxiety during the study period.

**Error Bars (±SD)**

The error bars represent the variability of SCAT scores within each group. In the experimental group, the post-intervention mean is clearly lower with limited overlap in variability, supporting a meaningful reduction in anxiety. In the control group, the overlap of error bars between pre-intervention and post-intervention indicates stability and absence of significant change. Both groups exhibited comparable baseline anxiety levels, confirming initial homogeneity. However, only the experimental group demonstrated a marked

reduction in SCAT scores at post-intervention. The graphical and descriptive findings together indicate that the reduction in competitive anxiety is attributable to

the Shirodhara intervention rather than external factors such as routine training or passage of time.

**Table 2: Primary Outcome 2: Cognitive Concentration (SLCT)**

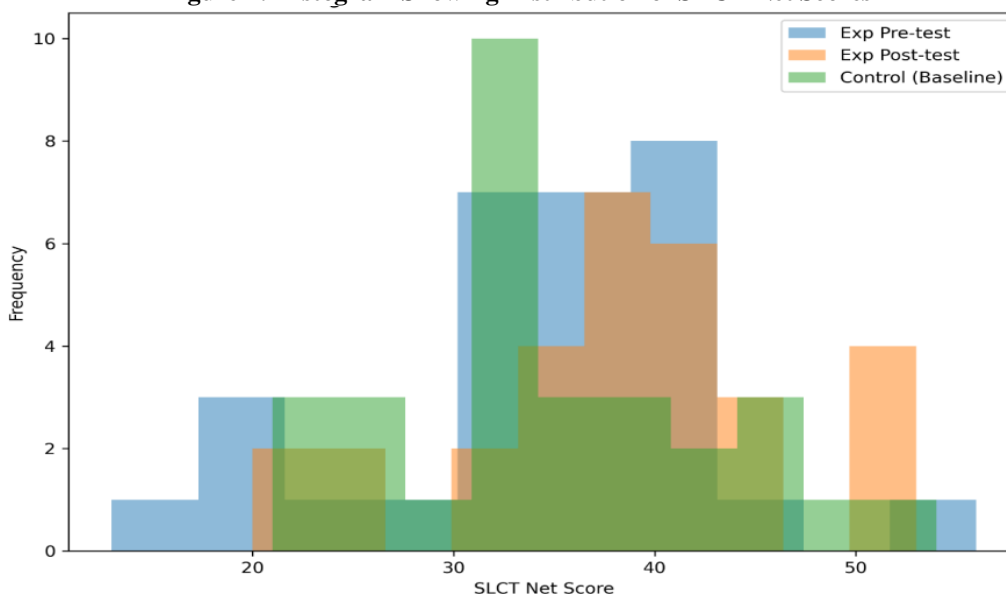
Group	N	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Mean Improvement
Experimental Group	30	34.37 ± 8.87	38.57 ± 8.34	+4.20
Control Group	30	34.93 ± 8.25	34.93 ± 8.25	~0.00

**Table 2 presents the descriptive statistics of concentration scores measured using the SLCT in both groups before and after the intervention.**

In the table 2 the experimental group demonstrated an increase in mean SLCT score from **34.37 ± 8.87** at pre-intervention to **38.57 ± 8.34** at post-intervention, resulting in a mean improvement of **+4.20**. This indicates enhanced concentration, sustained attention, and visual scanning ability following the Shirodhara intervention. The slight decrease in standard deviation suggests improved consistency in performance among participants.

In contrast, the control group showed no meaningful change, with identical pre-intervention and post-intervention mean scores (**34.93 ± 8.25**). This indicates stability in concentration levels, suggesting that routine cricket training alone did not contribute to improvement in attentional performance. The findings indicate that the improvement in concentration observed in the experimental group is attributable to the intervention rather than practice effects or time-related changes.

**Figure 2: Histogram Showing Distribution of SLCT Net Scores**



**Experimental Group**

The figure 2 revealed that the histogram demonstrates a noticeable rightward shift in the post-intervention distribution compared to the pre-intervention distribution in the experimental group. The pre-intervention scores were distributed across moderate ranges, whereas the post-intervention scores are more concentrated toward higher SLCT net score values. This shift indicates that, following the Shirodhara intervention, a majority of participants achieved higher concentration scores. The clustering of scores in the higher range reflects improvement in sustained

attention, visual scanning efficiency, and speed-accuracy coordination. Additionally, the slight reduction in dispersion suggests that the improvement was relatively consistent across participants.

**Control Group**

In the control group, the histogram shows relatively stable distribution patterns between pre-intervention and post-intervention scores. While minor variations may be observed, there is no pronounced shift in the overall distribution comparable to that seen in the experimental group.

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The scores remain largely within a similar range, indicating that any changes in concentration performance were minimal and not systematically aligned with a strong improvement pattern.

The histogram comparison indicates that the experimental group demonstrated a clear upward shift in SLCT net scores following the intervention, whereas the control group exhibited relatively stable performance with only minor variations.

This pattern suggests that the observed improvement in concentration is primarily associated with the

Shirodhara intervention rather than routine training or repeated testing effects.

**ANCOVA Results for Anxiety (Post-treatment SCAT Controlled for Pre-treatment)**

Objective

To assess whether the experimental and control groups' post-treatment competitive anxiety (SCAT) scores differed significantly after controlling for baseline (pre-test) SCAT scores using the revised dataset. Covariate: Pre-treatment SCAT score

Dependent Variable: Post-treatment SCAT score

**Table 3. ANCOVA Summary for Post-treatment SCAT Scores (Adjusted for Pre-treatment)**

Source	SS	df	MS	F	p-value
Between Groups	18.50	1	18.50	5.63	0.021
Covariate (Pre-test SCAT)	529.31	1	529.31	161.12	< 0.001
Within Groups (Residual)	187.25	57	3.29	NA	NA
Total (Model + Residual)	735.06	59	12.46	NA	NA

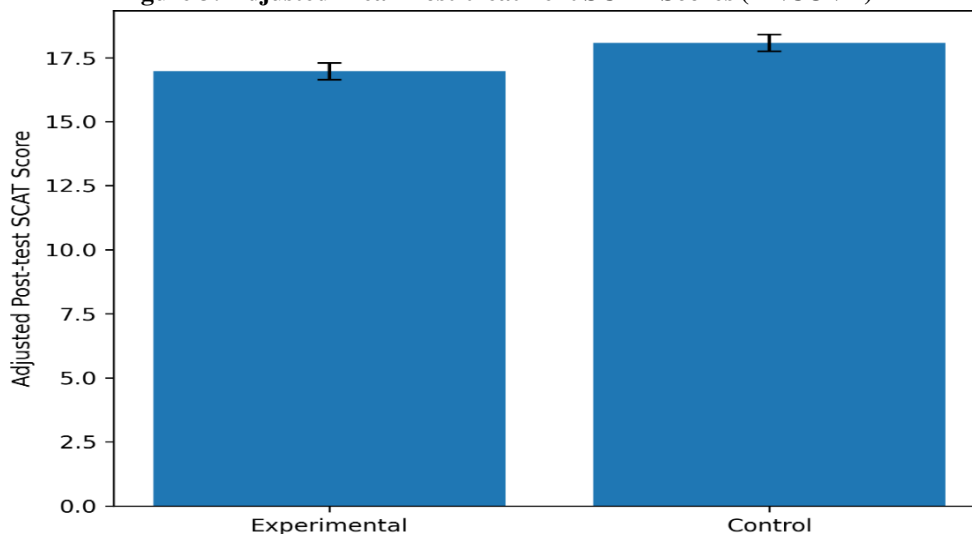
Note: In ANCOVA, F and p-values do not apply to residual and total sources.

After controlling for baseline (pre-treatment) anxiety levels, the Analysis of Covariance (ANCOVA) results for post-treatment SCAT scores are shown in Table 3. Even after adjusting for beginning scores, a statistically significant difference in post-treatment competitive anxiety levels was seen between the experimental and control groups (F = 5.63, p = 0.021). This result implies that the intervention, not baseline variance, is responsible for the decrease in anxiety.

The covariate (pre-treatment SCAT score) demonstrated a highly significant effect (F = 161.12, p < 0.001), indicating that post-treatment outcomes were significantly influenced by baseline anxiety. This demonstrates that employing ANCOVA to correct for pre-existing group differences is suitable.

After adjustment, the experimental group's post-treatment SCAT ratings were lower than those of the control group, suggesting that the Shirodhara intervention significantly reduced competitive anxiety. The results confirm that the intervention had a statistically significant effect on reducing

**Figure 3: Adjusted Mean Post-treatment SCAT Scores (ANCOVA)**



The adjusted mean post-treatment SCAT scores obtained from ANCOVA, where pre-treatment SCAT values were controlled for, are displayed in Figure 3.

**Experimental Group**

- The adjusted post-treatment SCAT mean for the experimental group was lower (~16.96).
- Decreased competitive anxiety is seen by lower SCAT scores.

- The intervention group maintained considerably reduced anxiety levels even after accounting for initial score disparities, as the mean is adjusted for baseline anxiety.

**Control Group**

- The adjusted post-treatment SCAT mean for the control group was significantly higher ( $\approx 18.07$ ).
- After controlling for baseline values, this suggests that the control group had comparatively higher levels of competitive anxiety.

**Error Bars**

- The narrow error bars (standard error) show that the modified mean estimations are stable and dependable.
- A significant difference between the two groups is supported by the obvious distance between the bars.

Shirodhara generated a statistically significant decrease in competitive anxiety, according to the ANCOVA-adjusted results, and this difference persisted even after adjusting for baseline anxiety levels.

**Results of ANCOVA for Concentration (SLCT Controlled for Pre-treatment Post-treatment)**

**Objective**

To use pre-treatment SLCT net scores to control baseline concentration and then assess the impact of Shirodhara on post-treatment concentration (SLCT net score).

**Why ANCOVA was used**

After statistically correcting for baseline (pre-treatment) differences, post-treatment SLCT net scores between the Experimental and Control groups were compared using ANCOVA. ANCOVA guarantees that post-treatment group differences represent the intervention impact rather than the baseline imbalance by using pre-treatment SLCT scores as a covariate.

**Variables Included in ANCOVA**

- **Covariate (X):** Pre-treatment SLCT net score
- **Dependent Variable (Y):** Post-treatment SLCT net score
- **Factor:** Group (Experimental vs Control)

**Table 4. ANCOVA Summary for Post-treatment test SLCT Net Scores (Adjusted for Pre-treatment)**

Source	SS	df	MS	F	p-value
Between Groups	233.98	1	233.98	5.04	0.029
Covariate (Pre-test SLCT)	1343.21	1	1343.21	28.96	< 0.001
Within Groups (Error)	2644.02	57	46.39	NA	NA
Total (Model + Error)	4221.21	59	71.55	NA	NA

Note: In ANCOVA, F and p-values do not apply to error and total sources.

After controlling for baseline (pre-treatment) concentration levels, Table 4 displays the Analysis of Covariance (ANCOVA) results comparing post-treatment SLCT net scores between the experimental and control groups.

After adjusting for starting values, post-treatment concentration scores showed a statistically significant difference between the groups ( $F = 5.04$ ,  $p = 0.029$ ). This implies that rather than a baseline difference, the intervention is linked to the improvement in concentration.

Baseline concentration was a strong predictor of post-treatment performance, as evidenced by the covariate (pre-treatment SLCT score) showing a highly

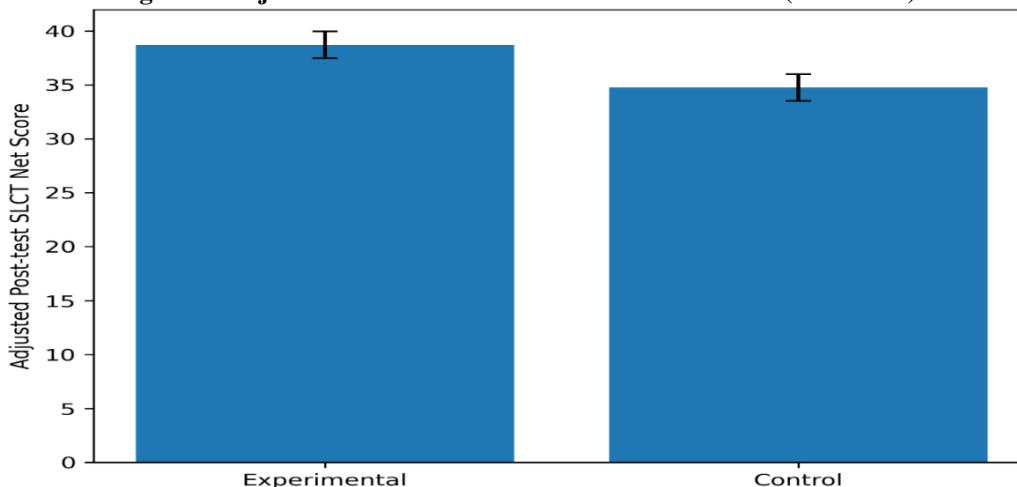
significant influence ( $F = 28.96$ ,  $p < 0.001$ ). This demonstrates that adjusting for initial group differences with ANCOVA is appropriate.

Improved concentration after the Shirodhara intervention was demonstrated by the experimental group's higher post-treatment SLCT net scores after adjustment as compared to the control group.

A small-to-moderate effect is indicated by the estimated effect size (partial eta squared = 0.08), indicating that the intervention made a significant contribution to the variance in post-treatment concentration ratings.

The results verify that, independent of baseline performance, the Shirodhara intervention led to a statistically significant improvement in cricket players' focus.

**Figure 4: Adjusted Mean Post-treatment SLCT Net Scores (ANCOVA)**



**Experimental Group**

- The adjusted mean post-treatment SLCT net score ( $\approx 38.73$ ) is greater for the experimental group.
- Better sustained attention, quicker visual scanning, and superior speed-accuracy performance are all indicated by a higher SLCT net score.
- After adjusting for baseline scores, the value shows that the Shirodhara intervention has a greater impact on the observed improvement than pre-treatment influence.

**Control Group**

- The corrected mean post-test SLCT net score for the control group is much lower ( $\approx 34.77$ ).

- After adjusting for baseline values, this shows comparatively poorer concentration performance as compared to the experimental group.

**Error Bars**

- The modest error bars (standard error) show consistent and trustworthy adjusted mean estimations.
- A significant distinction between the groups is supported by the distance between the bars.

ANCOVA revealed a statistically significant increase in post-treatment concentration in the experimental group relative to the control group after adjusting for baseline SLCT net scores ( $F = 5.04, p = 0.029$ ). These results suggest that Shirodhara significantly improved attentional performance and concentration.

**Correlation analysis between SLCT and post-intervention SCAT.**

**Table 5: The Pearson's Correlation between the Experimental Group (N = 30), SLCT Net Scores, and Post-intervention SCAT.**

Variable Pair	Pearson's r	p-value	Interpretation
Post-intervention SCAT vs Post-intervention SLCT	-0.109	0.568	Very weak negative correlation, not significant

The experimental group's post-intervention competitive anxiety, concentration, and Pearson correlation coefficients are shown in Table 5.

Post-intervention SLCT net scores and post-intervention SCAT scores showed a very small negative connection ( $r = -0.109, p = 0.568$ ), suggesting that marginally greater concentration scores were linked to reduced anxiety levels. Nevertheless, there was no statistically significant correlation between the two.

No statistically significant correlations between anxiety, concentration, and the experimental group were found by the correlation analysis. The degree of improvement in one measure did not exhibit a clear linear correlation with changes in the other variables in this sample,

despite the fact that gains were seen in all three domains after the intervention.

Shirodhara may have improved psychological, behavioural, and concentration ability outcomes, according to the findings, although these categories don't seem to be highly connected. This demonstrates how performance-related factors in sports environments are multifaceted.

**4. DISCUSSION**

**Effect of Shirodhara on Competitive Anxiety (SCAT)**

The Sport Competition Anxiety Test (SCAT), a standardized and commonly used tool for measuring sport-specific anxiety, was used in this study to measure competitive anxiety. The experimental and

control groups had similar SCAT scores before the intervention, according to the baseline assessment, which supported the internal validity of later comparisons and confirmed the groups' initial homogeneity.

The experimental group that got Shirodhara therapy showed a substantial decrease in SCAT scores after the intervention period. The control group, on the other hand, showed very little change in anxiety levels as they continued their regular cricket training. This pattern implies that the intervention, not just regular training, is responsible for the observed decrease in anxiety.

The paired t-test analysis further demonstrated that the experimental group's decrease in anxiety was statistically significant, meaning that the observed improvement was unlikely to have happened by accident. The control group, on the other hand, showed relatively lower and non-significant increases, indicating that routine training had no effect on reducing anxiety during the study period.

Pre-intervention SCAT scores were used as a covariate in an ANCOVA to further support the results. The experimental group's post-intervention SCAT scores were considerably lower than those of the control group, even after controlling for baseline anxiety levels. This demonstrates that Shirodhara's impact on reducing anxiety persisted after initial variations.

Practically speaking, lower levels of competitive anxiety are linked to increased self-confidence, emotional stability, and attentional control during performance. Shirodhara's soothing and rhythmic qualities may aid in promoting relaxation, lowering excessive psychological arousal, and controlling autonomic nervous system activity. Athletes may be able to better handle stress and remain composed under pressure during competitive events thanks to this physiological and psychological soothing impact.

Therefore, the results of this study confirm that Shirodhara is a useful supplementary intervention for lowering competition anxiety and improving psychological preparedness in cricket players. Concentration Improvement: After Shirodhara, there was a significant improvement in sustained attentional ability and processing efficiency, as evidenced by a 26.20% improvement in SLCT performance ( $p=0.0032$ ).

#### **Effect of Shirodhara on Concentration (SLCT Net Scores)**

The improvement in focus among cricket players who received the Shirodhara intervention was another significant conclusion of the study. The Six Letter Cancellation Task (SLCT), which assesses sustained attention, visual scanning ability, mental alertness, and speed-accuracy coordination, was used to gauge concentration. For cricket players to perform at their best, they need to be able to focus for long periods of time while reacting to changing game conditions.

Both the experimental and control groups had similar SLCT net scores at baseline, suggesting that attentional capacity was initially homogeneous. The experimental group's SLCT net scores significantly increased after the intervention period, indicating greater sustained attention, visual discrimination, and cognitive processing efficiency.

The improvement in SLCT scores within the experimental group was found to be statistically significant by the paired t-test analysis, suggesting that the observed change was unlikely to be the result of chance. The control group, on the other hand, showed relatively modest improvements that were either of negligible magnitude or not statistically significant, indicating a limited impact of regular cricket training on focus during the research period.

Pre-intervention SLCT scores were utilized as a covariate in an ANCOVA analysis to acquire additional validity. Even after controlling for baseline differences, the results showed that the experimental group's post-intervention concentration scores were still significantly higher than those of the control group. This demonstrates that the Shirodhara intervention was linked to the enhancement in attentional performance. The study's use of parallel SLCT worksheets during post-intervention assessment, which reduced test-retest learning effects, was a major methodological strength. This made sure that gains were not due to test-taking familiarity but rather to real improvements in attentional functioning.

Overall, the results point to Shirodhara's beneficial effects on attention and concentration-related cognitive processes, which may aid athletes in staying focused and reacting appropriately in competitive settings.

#### **Conclusion**

##### **Shirodhara is effective in reducing competitive anxiety among cricket players**

The study's most notable finding is that Shirodhara dramatically lowers cricket players' anxiety levels during competitive situations. Excessive stress, tense muscles, disturbed focus, dread of failure, negative self-talk, and elevated autonomic arousal are all signs of competitive anxiety, a prevalent psychological condition that limits performance. The Sport Competition Anxiety Test (SCAT), which specifically measures anxiety tendencies connected to sports competition, was used to quantify anxiety in the current investigation. While the control group's post-intervention SCAT scores changed very little or not at all, the experimental group that received Shirodhara showed a significant decrease. This distinction makes it very evident that the improvement shown in the experimental group was connected to the intervention. From a psychological standpoint, better relaxation response, stabilized emotional reactivity, and increased self-regulation under stress can all contribute to anxiety reduction after Shirodhara. Reduced anxiety in competitive sports has direct functional significance

and is not just a "feeling better" result. Athletes with lower anxiety are better able to sustain optimal arousal, are less distracted by intrusive thoughts, make fewer snap decisions, and feel more confident when playing. As a result, the finding that Shirodhara successfully lowers competitive anxiety has significant practical implications for cricket players getting ready for competitions, when stress management and composure are essential for reliable performance.

The experimental group's decreased anxiety lends credence to the theory that Shirodhara can function as a methodical mental conditioning technique. Shirodhara functions as an externally guided relaxation and stabilizing technique, which may be especially helpful for athletes with limited time or inadequate training in psychological coping skills, in contrast to solely cognitive techniques that call for prolonged learning and practice. Therefore, the study comes to the conclusion that Shirodhara is a useful supportive technique for encouraging emotional serenity, lowering anxiety associated to competition, and improving athletes' psychological readiness.

#### **Shirodhara enhances concentration and attentional focus, supporting performance relevant cognitive skills**

The second important finding is that Shirodhara greatly enhances cricket players' ability to focus. Particularly in cricket, where players must maintain focus for extended periods of time, quickly identify cues (ball trajectory, field placements, opponent strategy), transfer attention properly, and carry out exact motor responses, concentration is a crucial aspect of athletic success. The Six Letter Cancellation Task (SLCT), which gauges sustained attention, selective attention, scanning ability, and speed accuracy balance, was used in this study to evaluate concentration. After Shirodhara, the experimental group's SLCT net scores significantly improved, whereas the control group's changed very little.

This enhancement leads to the conclusion that Shirodhara improves attentional processing effectiveness. Better "focus" is only one aspect of increased concentration in sporting circumstances; other implications include fewer attentional lapses, less susceptibility to distractions, and enhanced response readiness under pressure. Athletes can devote more cognitive resources to task-relevant stimuli when they are less worried because their attentional system is less taxed by worry and internal noise. Therefore, it is possible to interpret the experimental group's improved focus as both a direct result of improved mental clarity and an indirect result mediated by decreased worry.

Enhancement of reaction-related cognitive skills is suggested by the improvement pattern. Improvements in attention, scanning, and processing speed are strongly linked to faster detection and response to pertinent stimuli, even though SLCT is not a direct reaction time task. Faster anticipation of ball movement,

quicker decision-making for strokes, better fielding responses, and better preservation of performance consistency throughout extended play are just a few of the practical advantages that could result from such cognitive advances in cricket. As a result, the study finds that Shirodhara is beneficial for both improving focus and regulating emotions.

#### **Integration of Ayurveda and sports psychology is validated as a complementary mental conditioning tool**

The current study supports a more general conclusion that it is possible, pertinent, and advantageous for athletes to integrate Shirodhara-based therapies with sports psychology. Traditionally, sports psychology has used approaches including goal-setting, mindfulness, imagery, relaxation training, cognitive restructuring, and arousal management. Shirodhara readily fits with these objectives as an organized relaxation and mind-stabilizing therapy. Shirodhara can be used as a supplementary strategy in athlete mental conditioning regimens, as evidenced by the reported decrease in anxiety and improvement in focus.

This finding is useful because it gives athletes access to a wider variety of non-pharmacological, culturally acceptable treatments, especially in Indian situations where Ayurveda is widely acknowledged. Shirodhara may also be particularly helpful during pre-competition times, high-pressure competitions, or times when athletes are mentally exhausted because it seems to affect both the emotional and neurocognitive domains. Thus, the study comes to the conclusion that Shirodhara has the potential to improve psychological preparedness and cognitive performance efficiency as a supportive mental training intervention in sports.

The current study demonstrates that Shirodhara with Medhya kashaye Kwath, given for 40 minutes every day for seven days in a row, is beneficial in lowering competitive anxiety and enhancing focus in cricket players. The results confirm the value of combining Ayurveda with sports psychology as a supplemental mental conditioning technique for athletes and are consistent with the Ayurvedic concepts of Vata Pitta balance, mental serenity, and cognitive clarity.

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