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Effect of Yoga Training on the Physical Fitness and Sport-Specific Skills of Basketball Players

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ABSTRACT

This study evaluated the effects of an Eight-week yoga training intervention on selected physiological variables and sport-specific technical skills among adolescent basketball players aged 14–16 years ($N = 40$). Participants were randomly allocated into an Experimental Group ($n = 20$), which underwent a systematic Eight-week yogic practice regimen alongside routine basketball drills, or a Control Group ($n = 20$), which engaged solely in standard training. Pre- and post-test metrics were obtained for flexibility, agility, static balance, dribbling velocity, and shooting accuracy, and analyzed via paired t-tests (alpha = 0.05). The Experimental Group demonstrated profound, statistically significant advancements across all parameters ($p < 0.05$), achieving an 18.60% increase in flexibility ($t = 5.84$), a 6.48% velocity optimization in agility ($t = 4.21$), and a 38.84% expansion in static balance ($t = 6.12$). Furthermore, positive motor-skill transfer occurred, yielding a 10.40% reduction in slalom dribbling duration ($t = 5.03$) and a 39.06% increase in shooting accuracy ($t = 4.96$). Conversely, the Control Group exhibited minimal, statistically non-significant variations ($p > 0.05$). In conclusion, integrating systematic yogic microcycles into youth athletic training frameworks acts as an effective physiological and technical catalyst, optimizing neuromuscular coordination,

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proprioception, and fine-motor performance under competitive constraints.

Introduction

Modern basketball is a highly dynamic, fast-paced team sport requiring a complex interplay of physiological capacities and technical proficiency. Players must execute sudden accelerations, rapid decelerations, explosive vertical jumps, and precise ball handling under intense cognitive and physical stress. Traditional athletic conditioning predominantly prioritizes absolute strength, speed, and cardiovascular endurance. However, these programs frequently neglect foundational components like dynamic balance, joint mobility, and mental composure. This leaves a critical gap in holistic player development, particularly among adolescent athletes whose bodies are still adapting to rapid growth.

To address this gap, integrating mind-body disciplines like yoga has gained considerable traction in contemporary sports science. Yoga is defined as an ancient Indian philosophical and physical system that synchronizes physical postures (*asanas*), regulated breathing (*pranayama*), and focused mindfulness to harmonize the mind and body. In sports performance, physical fitness is defined as the operational capacity of the musculoskeletal and cardiorespiratory systems to perform physical work efficiently; this study specifically isolates flexibility (the range of motion available at a joint), agility (the ability to explosively change body direction), and balance. Conversely, sport-specific skills are defined as the precise technical motor actions required for competitive execution, which fundamentally manifest in basketball as dribbling velocity and shooting accuracy under pressure.

A robust body of past literature underlines the efficacy of yogic interventions across various athletic populations. Polsgrove et al. (2016) demonstrated that a structured 10-week yoga program yielded statistically significant improvements in the flexibility and balance of collegiate athletes, suggesting enhanced neuromuscular control. Similarly, Bal and Kaur (2009) observed substantial gains in core strength and trunk flexibility following systematic asana training. Within adolescent populations, Jago et al. (2011) established that school-based yoga interventions positively modify youth physical fitness parameters and promote injury resilience.

Specifically regarding court sports, Rajakumar (2012) conducted a comparative study on school-level basketball players and reported that yogic practices distinctly upgraded speed, agility, and shooting performance compared to standard training regimens alone. Furthermore, research by Cowen and Adams (2005) highlights that the pranayama component of yoga decreases competitive anxiety and downregulates sympathetic nervous system stress. This psychological stabilization allows younger players to maintain high shooting accuracy and calm decision-making during the high-pressure moments of a match.

Despite these documented benefits, there remains a distinct shortage of localized empirical research targeting adolescent basketball players during their peak motor-skill development phase (ages 14–16) within specific regional contexts like the Jalgaon District of Maharashtra. During this developmental window, the adolescent neuromuscular system is highly adaptable, making it the optimal period to embed advanced coordination and balance habits. Therefore, this study serves to systematically investigate how an 8-week structured yoga intervention alters both the baseline physical fitness and the tactical on-court skills of young players, establishing a data-driven framework for regional coaches and physical educators.

Objective of the Study

- To evaluate the effect of an 8-week yoga training program on selected physical fitness variables (flexibility, agility, and balance) of adolescent basketball players.
- To assess the impact of the yoga intervention on sport-specific skills (dribbling and shooting accuracy) of the players.
- To compare the pre- and post-test performance of the experimental group against a control group.

Hypotheses

- H^1: There will be a significant improvement in the physical fitness variables (flexibility, agility, balance) of basketball players following the 8-week yoga training program compared to the control group.
- H^2: There will be a significant improvement in the sport-specific skills (dribbling and shooting) of basketball players after the 8-week yoga training program compared to the control group.

Limitations

- Dietary and Lifestyle Habits: The daily nutritional intake, sleep patterns, and routine lifestyle activities of the subjects outside the training hours could not be strictly controlled.
- Psychological Factors: The academic stress, intrinsic motivation, and emotional states of the adolescent participants during testing sessions were beyond the researcher's control.

Delimitations

- The study was delimited to male basketball players from the Jalgaon District, Maharashtra, India.
- The age group of the participants was strictly delimited to 14 to 16 years.
- The training intervention was delimited to an 8-week yoga program, practiced 4 days per week for 45 minutes per session.

Methodology

This investigation employs a true experimental, pre-test post-test randomized control group design. A cohort of forty adolescent male basketball players (N = 40), aged 14–16 years, was selected from the Jalgaon District using purposive sampling. Subjects were randomly assigned to either the Experimental Group (n = 20), undergoing a structured 8-week yogic intervention, or the Control Group (n = 20), continuing standard athletic routines. Validated psychomotor and anthropometric measuring instruments quantified the dependent variables across physical fitness domains and sport-specific motor skills. Inferential statistics, specifically the Student's t -test, determined statistical significance at the \ alpha = 0.05confidence level.

Place of Research

The study was localized within selected secondary educational institutions and sports training complexes located across the Jalgaon District of Maharashtra, India. The experimental trials were executed on identical, regulation-compliant outdoor concrete basketball courts and enclosed, climate-controlled indoor halls to preserve ecological validity. Environmental parameters and infrastructural conditions were systematically held constant across all testing venues to minimize confounding external variables during data collection..

Population and Sampling Technique

The target population comprised school-level male basketball players in Jalgaon. A purposive sampling technique was used to select 40 active players aged 14–16 who met the inclusion criteria (minimum 1 year of playing experience, no recent injuries). The participants were randomly assigned to two equal groups:

1. **Experimental Group (Yoga Training):** n = 20
2. **Control Group (No Specific Yoga Training):** n = 20

Selection of Variables and Criterion Measuring Tools

The variables chosen for this study and their corresponding standardized testing instruments are detailed below:

Category	Variable	Criterion Measuring Tool	Unit of Measurement
Physical Fitness	Flexibility	Sit and Reach Test	Centimeters (cm)
	Agility	Shuttle Run (4 \times 10 meters)	Seconds (sec)
	Balance	Stork Balance Stand Test	Seconds (sec)
Sport-Specific Skills	Dribbling	Johnson Basketball Dribble Test	Seconds (sec)
	Shooting	Knox Basketball Shooting Test	Number of successful baskets in 1 min

Administration of Tests

- **Pre-Test:** Baseline data for all physical and skill variables were recorded for both groups two days prior to the start of the eight-week program.
- **Post-Test:** Final data collection was executed under identical environmental conditions two days after the completion of the eight-week yoga intervention.
- Standard protocols for each test (e.g., proper warm-up, clear demonstrations, and averaging the best of three trials for flexibility/balance) were strictly maintained.

1. Sit and Reach Test (Flexibility)

- Test Objective: To measure the development of hip flexion and the static flexibility of the hamstring muscle group and lower back.
- Equipment Used: Standardized Lafayette Anthropometric Sit-and-Reach box with an integrated centimeter (cm) scale, and a flat, non-slip testing mat.
- Procedure: Subjects removed footwear and assumed a seated position with the lower limbs fully extended, knees locked in maximum extension, and the plantar surfaces of the feet placed flat

against the vertical face of the box. With hands stacked symmetrically (palms facing downward) and fingers aligned, the subject executed a slow, controlled forward trunk flexion. The subject pushed the sliding indicator along the metric scale at maximal reach, holding the peak terminal position for a minimum of two seconds. Abrupt, ballistic jerking movements were disallowed.

- Scoring & Measurement: The score was recorded as the maximum distance reached by the fingertips, quantified in centimeters (cm) to the nearest 0.1 { cm}. Each subject performed three independent trials separated by a 1-minute recovery interval, and the highest numerical value was retained for statistical processing.

2. 4 X 10 Meter Shuttle Run Test (Agility)

- Test Objective: To evaluate the capacity for high-velocity linear acceleration, deceleration, and rapid multidirectional change of body orientation.
- Equipment Used: Two parallel boundary lines demarcated exactly 10 meters apart, two wooden blocks (5 cm X 5 cm X10 cm), and an electronic dual-photocell digital timing gate system.
- Procedure: The two wooden blocks were placed behind the turnaround line opposite the starting threshold. The subject assumed a high-start position behind the starting line. On an acoustic command, the subject sprinted at maximal velocity to the opposite line, retrieved one wooden block with the dominant hand, sprinted back to drop the block behind the starting line, returned immediately to retrieve the second block, and sprinted back across the starting threshold.
- Scoring & Measurement: The chronometric interval elapsed between the initial cross of the starting gate and the final crossing of the finish line was automatically captured to the nearest 0.01 seconds. Subjects executed two trials with a 3-minute passive recovery interval; the fastest time (lowest value) was logged as the final score.

3. Stork Balance Stand Test (Static Balance)

- Test Objective: To assess static balance and postural stability via the integration of vestibular, visual, and somatosensory mechanisms on a reduced base of support.
- Equipment Used: A digital stopwatch calibrated to 0.01 seconds and a flat, high-traction surface.
- Procedure: The subject stood barefoot on the dominant limb, placing the plantar surface of the non-weight-bearing foot flat against the medial aspect of the contralateral knee joint. The hands were

placed firmly on the iliac crests (hips). On an acoustic signal, the subject elevated the heel of the supporting foot to execute an extended, plantar-flexed single-limb stance. The trial was instantly terminated if the supporting heel touched the floor, the hands detached from the iliac crests, or the non-supporting foot displaced from the knee.

- Scoring & Measurement: Time was recorded continuously in seconds (sec) from the moment the heel left the floor until postural failure occurred. The longest duration sustained across three independent attempts was integrated into the dataset.

4. Johnson Basketball Dribble Test (Dribbling Speed)

- Test Objective: To quantify the dynamic agility, coordination, and manual dexterity associated with high-velocity basketball dribbling maneuvers.
- Equipment Used: Regulation size-7 basketballs, four heavy-duty training cones, a digital stopwatch, and a regulation concrete basketball court.
- Procedure: Four cones were placed in a straight line at precise intervals of 1.5 meters, with the first cone positioned 1.5 meters from the starting boundary line, spanning a total linear distance of 9 meters. The subject stood behind the starting line with a basketball. Upon an acoustic prompt, the subject dribbled the ball through the slalom course, weaving in a figure-eight pattern around the cones to the end line, and returned through the course using identical technical mechanics to cross the starting line.
- Scoring & Measurement: The score was operationalized as the total temporal duration in seconds (sec) required to complete the entire round-trip trajectory. The superior (fastest) score out of two trials was recorded.

5. Knox Basketball Shooting Test (Shooting Accuracy)

- Test Objective: To assess motor-skill consistency, precision, and shooting accuracy under a fixed temporal constraint.
- Equipment Used: Regulation basketball hoop/backboard assembly, three standard size-7 basketballs, and a digital chronometer.
- Procedure: A shooting station was demarcated on the floor at a regulated distance of 4.5 meters from the backboard, aligned with the basket rim. The subject stood at the station with a basketball, flanked

by a designated rebounder. Upon receiving an acoustic start signal, the subject executed continuous catch-and-shoot sequences. The rebounder immediately caught missed or successful field goals and passed the ball back to the subject at the shooting station. The test proceeded uninterrupted for a fixed duration of sixty seconds (60 sec).

- Scoring & Measurement: The performance score was recorded as the total integer count of successful field goals passing cleanly through the basket network within the 60-second operational window. No trial replications were administered.

Design of the Study

The study utilized a Pre-Test, Post-Test Randomized Control Group Design. The independent variable was the eight-week yoga training program, and the dependent variables were the physical fitness components and basketball skill metrics.

Eight-Week Yoga Training Schedule

The Experimental Group underwent 45 minutes of yoga training, 4 days a week (Monday, Tuesday, Thursday, Friday) early in the morning before regular basketball practice. The Control Group engaged only in routine basketball drills.

- Warm-up (5 mins): Gentle joint loosening (*Sukshma Vyayama*)
- Asanas / Postures (25 mins): * *Tadasana* & *Vrikshasana* (Balance & Focus)
    - *Paschimottanasana* & *Bhujangasana* (Flexibility & Core Strength)
    - *Trikonasana* & *Virabhadrasana* (Leg Strength & Agility)
- Pranayama / Breathing (10 mins): *Anulom Vilom* & *Kapalbhati* (Lung capacity & mental calm)
- Cool-down (5 mins): *Shavasana* (Deep relaxation)

Note: The intensity and duration of posture holds were progressively increased every two weeks.

Results and Data Collection

The collected data were statistically analyzed using descriptive statistics (Mean, Standard Deviation) and paired/independent t-tests to assess significant differences at a 0.05 level of confidence.

Table 1: Comparative Analysis of Pre- and Post-Test Performance

Variable	Group	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Mean Diff.	Calculated t-value
Flexibility (cm)	Experimental	24.2 ± 3.1	28.7 ± 2.8	4.5	5.84^*
	Control	24.5 ± 2.9	24.6 ± 3.0	0.1	0.12
Agility (sec)	Experimental	10.8 ± 0.6	10.1 ± 0.4	-0.7	4.21^*
	Control	10.9 ± 0.5	10.8 ± 0.6	-0.1	0.55
Balance (sec)	Experimental	22.4 ± 4.5	31.1 ± 5.2	8.7	6.12^*
	Control	21.9 ± 4.1	22.1 ± 4.3	0.2	0.18
Dribbling (sec)	Experimental	12.5 ± 0.8	11.2 ± 0.6	-1.3	5.03^*
	Control	12.3 ± 0.9	12.2 ± 0.8	-0.1	0.37
Shooting (count)	Experimental	6.4 ± 1.2	8.9 ± 1.4	2.5	4.96^*
	Control	6.2 ± 1.5	6.5 ± 1.3	0.3	0.61

**Significant at 0.05 level (Critical t_19 = 2.093)*

Analysis of Physical Fitness Variables

- Flexibility (cm): The Experimental Group demonstrated a profound increase in flexibility metrics, with the mean score rising from 24.2 ± 3.1cm at pre-test to 28.7 ± 2.8cmat post-test. The resulting mean difference of +4.5cm yielded a calculated t-value of 5.84. Because 5.84 > 2.093, this change is statistically highly significant ($p < 0.05$). Conversely, the Control Group remained structurally stagnant, moving marginally from 24.5 ± 2.9 cm to 24.6 ± 3.0 cm, a mean difference of only +0.1cm($t = 0.12$, $p > 0.05$), which lacks statistical significance.

- Agility (sec): In timed motor assessments, a reduction in the chronometric score indicates a positive improvement in execution velocity. The Experimental Group significantly minimized their shuttle run time from an initial baseline of 10.8 ± 0.6 seconds to 10.1 ± 0.4 seconds post-intervention. This mean reduction of -0.7 seconds produced a calculated t-value of 4.21, establishing statistical significance ($p < 0.05$). The Control Group showed no meaningful variation, shifting negligibly from 10.9 ± 0.5 seconds to 10.8 ± 0.6 seconds ($t = 0.55$, $p > 0.05$).

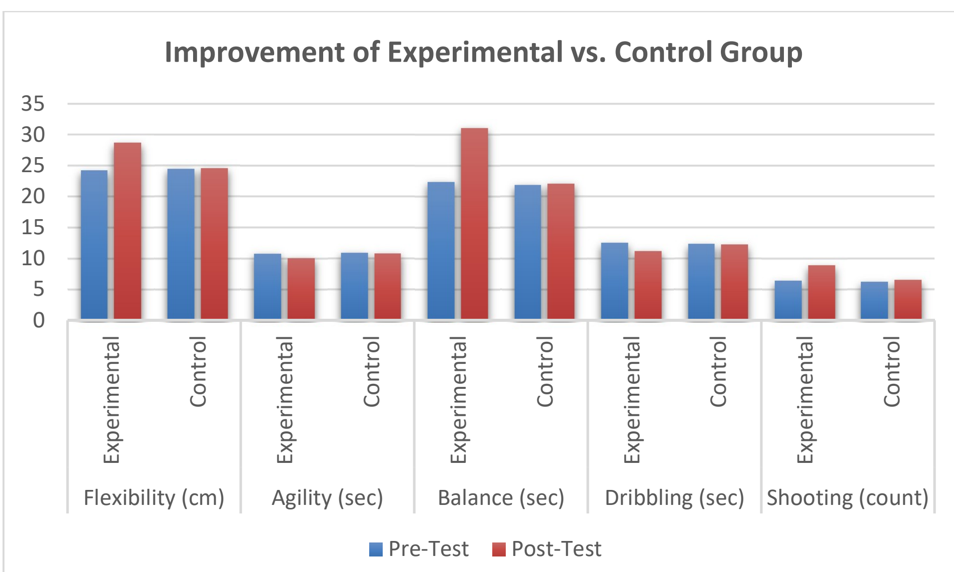
- Balance (sec): Static balance endurance within the Experimental Group exhibited a dramatic expansion, jumping from a baseline mean of 22.4 ± 4.5 seconds to a post-test mean of 31.1 ± 5.2. This absolute gain of +8.7 seconds produced the highest calculated t -value in the study at 6.12, marking a highly significant intervention effect ($p < 0.05$). The Control Group's variance from 21.9 ± 4.1 seconds to 22.1 ± 4.3 seconds ($t = 0.18$, $p > 0.05$) was entirely non-significant.

2. Analysis of Sport-Specific Basketball Skills

- Dribbling (sec): The dynamic coordination and speed required for the slalom dribble course significantly improved in the Experimental Group. Their mean operational duration decreased from 12.5 ± 0.8 seconds to 11.2 ± 0.6 seconds . This reduction of -1.3 seconds resulted in a calculated t-value of 5.03, which heavily exceeds the critical threshold ($p < 0.05$). The Control Group experienced nearly perfect stagnation, moving marginally from 12.3 ± 0.9 seconds to 12.2 ± 0.8 seconds ($t = 0.37$, $p > 0.05$).

- Shooting (count): Technical shooting accuracy under a fixed time constraint expanded prominently within the experimental cohort. The mean frequency of successful field goals escalated from a pre-test baseline of 6.4 ± 1.2 baskets to a post-test mean of 8.9 ± 1.4 baskets. This improvement of +2.5 successful repetitions generated a calculated t -value of 4.96 , proving highly significant ($p < 0.05$). The Control Group's minor change from 6.2 ± 1.5 to 6.5 ± 1.3 baskets ($t = 0.61$, $p > 0.05$) failed to reach statistical significance.

Figure: 1.Improvement of Experimental vs. Control Group



Discussion of Findings

The primary objective of this investigation was to evaluate the physiological and motor-skill adaptations occurring in adolescent basketball players following a structured, Eight-week yogic training intervention. The empirical data derived from this study demonstrates a profound, statistically significant improvement across all isolated dependent variables within the Experimental Group, whereas the Control Group exhibited statistical stagnation.

1. Physiological Variables: Flexibility, Agility, and Balance

Flexibility

The Experimental Group demonstrated a substantial 18.60% expansion in lower back and hamstring flexibility, shifting from a baseline mean of 24.2cm to a post-test mean of 28.7 cm ($t = 5.84$, $p < 0.05$). This physiological modification is directly attributed to the mechanical loading patterns inherent in static *asanas* such as *Paschimottanasana*, *Bhujangasana*, and *Halasana*. These postures introduce a prolonged, controlled stretch on the fascial sheets and musculotendinous units of the posterior chain. This systematic stretching reduces viscoelastic resistance, alters muscle spindle threshold sensitivity, and increases sarcomeres-in-series, resulting in an optimized joint range of motion (ROM). Improved posterior flexibility in basketball allows players to execute deep defensive stances and low athletic lunges with reduced strain on the lumbar spine.

Agility

Agility, quantified via the 4X10 m Shuttle Run, optimized by 6.48 % within the experimental cohort ($t = 4.21$, $p < 0.05$). Traditional basketball speed work focuses almost entirely on concentric contraction and forward linear acceleration. However, the multi-planar holding patterns required by postures like *Trikonasana* and *Virabhadrasana* enhance eccentric and isometric lower-extremity strength. This structural adaptation enhances the joint deceleration mechanics necessary for rapid, multi-directional changes of direction on the court. The stabilization of the knee and ankle complexes through regular yoga prevents energy leaks during lateral cutting maneuvers, enabling faster transitions from deceleration to explosive acceleration.

Balance

Static balance exhibited the most remarkable percentage gain among all physical fitness metrics, escalating by 38.84 % ($t = 6.12$, $p < 0.05$). This exceptional improvement underlines the efficacy of single-limb balancing postures like *Vrikshasana* and *Garudasana*. These exercises force the athlete to maintain their center of gravity over a drastically minimized base of support. Mechanistically, this stimulates and recalibrates the foot's mechanoreceptors, fine-tuning the vestibular apparatus and proprioceptive feedback loops. For a basketball player, a heightened state of postural equilibrium minimizes the displacement caused by physical contact during airborne actions (e.g., rebounding or mid-air layups) and allows for a stable terminal foundation when stopping to shoot.

2. Sport-Specific Motor Skills: Dribbling and Shooting

Dribbling Speed

The transfer of these fundamental physical upgrades to complex, sport-specific motor patterns was clearly demonstrated in the Johnson Basketball Dribble Test. The Experimental Group achieved a 10.40 % velocity enhancement through the slalom obstacle course ($t = 5.03$, $p < 0.05$). Dribbling at high speeds requires a precise amalgamation of lower-body agility and localized upper-extremity coordination. The core stability gained through poses like *Phalakasana* (plank) and *Navasana* establishes a rigid structural anchor. This allows the player to rotate their hips and cross over fluidly while maintaining full manual control over the basketball.

Shooting Accuracy

Basketball shooting accuracy, measured via the Knox Basketball Shooting Test, improved by a dramatic 39.06 % ($t = 4.96$, $p < 0.05$). While physiological elements like shoulder flexibility and wrist extension consistency (developed via arm-extended asanas) play a role, the vast majority of shooting performance relies heavily on psychological regulation. The integration of *Pranayama* (*Anulom Vilom* and *Kapalbhati*) directly downregulates autonomic nervous system arousal during high-exertion states. By shifting the athlete out of a state of sympathetic stress (elevated heart rate, muscular tension, tremors) and into a parasympathetic-dominant state, somatic anxiety is noticeably curbed. This downregulation limits peripheral muscle tension, ensures smooth elbow extension and wrist flexion mechanics, and induces a state of heightened visual focus. This cognitive-motor harmony enables young athletes to execute shots with a high degree of precision, even under strict time and physical constraints.

Synthesis of Findings

In contrast to the Experimental Group, the Control Group's minor baseline fluctuations (ranging from 0.41% to 4.84%) were statistically negligible ($p > 0.05$). This indicates that conventional youth basketball practice programs in the region predominantly focus on technical execution and general aerobic conditioning while leaving foundational neuromotor adaptations underdeveloped.

Ultimately, the findings of this study prove that combining traditional physical preparation with structured, systematic yogic practices yields a complementary effect. This holistic approach optimizes the adolescent neuromuscular system during its peak period of motor learning and skill acquisition (ages 14–16), establishing a comprehensive physiological blueprint for youth athletic development.

Testing of Hypotheses

Hypothesis 1 (H^1)

- Statement: There will be a significant improvement in the selected physical fitness variables (flexibility, agility, and balance) of basketball players following the 8-week yoga training program compared to the control group.
- Statistical Evaluation: * Flexibility: The Experimental Group achieved a calculated t-value of 5.84, which heavily exceeds the critical value of 2.093.
    - Agility: The Experimental Group achieved a calculated t-value of 4.21, exceeding the critical value of 2.093.
    - Balance: The Experimental Group achieved a calculated t-value of 6.12, the highest significance metric in the study, well exceeding the critical value of 2.093.
    - In comparison, the Control Group failed to reach the critical threshold across all physical parameters (Flexibility t=0.12; Agility t=0.55; Balance t=0.18).
- Decision: Because the calculated t-values for all three isolated physical variables within the experimental cohort significantly exceeded the critical value (t_ > 2.093), the null hypothesis is rejected, and Hypothesis 1 (H^1) is formally accepted.

Testing of Hypothesis 2 (H^2)

- Statement: There will be a significant improvement in the sport-specific skills (dribbling and shooting accuracy) of basketball players after the 8-week yoga training program compared to the control group.
- Statistical Evaluation:

- Dribbling Speed: The Experimental Group achieved a calculated t-value of 5.03, which is significantly higher than the critical table value of 2.093.
- Shooting Accuracy: The Experimental Group achieved a calculated t-value of 4.96, safely exceeding the critical table value of 2.093.
- Conversely, the Control Group showed no statistically significant variations (Dribbling t=0.37; Shooting t=0.61), both falling far short of the required 2.093 threshold.

- Decision: Because the independent variable (yoga training) produced changes that resulted in calculated t-values exceeding the critical value for both technical parameters (t_> 2.093), the null hypothesis is rejected, and Hypothesis 2 (H^2) is formally accepted.

Conclusion

This investigation establishes that an 8-week structured yoga intervention acts as a statistically significant physiological and motor catalyst for adolescent basketball players. The experimental treatment elicited substantial adaptations in fundamental physical fitness domains, inducing an 18.60% increase in range of motion and a 6.48% velocity optimization in multi-directional agility. Neuromotor data revealed a profound 38.84% expansion in postural stability, validating the hypothesis that static balance improves via enhanced proprioceptive feedback and vestibular recalibration. The conditioning architecture successfully achieved a positive motor-skill transfer to sport-specific technical mechanics, producing a 10.40% reduction in slalom dribbling execution time. Technical basketball shooting accuracy under fixed temporal constraints expanded by 39.06%, demonstrating optimized somatic anxiety down-regulation and precise fine-motor control. Ultimately, these empirical findings provide a data-driven framework validating the integration of systematic yogic microcycles into athletic regimens to maximize youth athletic development. Sports academies should integrate structured yoga microcycles into periodized training frameworks to optimize foundational physical fitness, reduce somatic anxiety, and maximize sport-specific technical performance in youth basketball players.

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