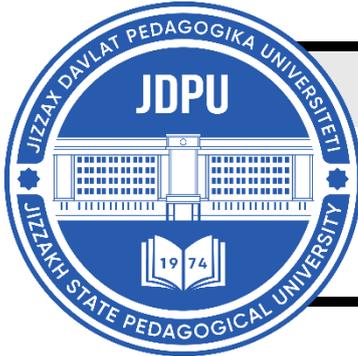


MENTAL ENLIGHTENMENT SCIENTIFIC –
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METHODOLOGICAL JOURNAL<http://mentaljournal-jspu.uz/index.php/mesmj/index>“ANALYSIS OF SCIENTIFIC SOURCES AND PRACTICAL
EXPERIENCE ON SHOT ACCURACY AND USE OF THE BACKBOARD IN
BASKETBALL”**Murodjon Odiljonovich Nazirov***Lecturer, Department of Theory and Methodology of Sports Games**Fergana State University**Email: Nazirov@gmail.com**Fergana, Uzbekistan*

ABOUT ARTICLE

Key words: Basketball, effective shooting using the backboard, backboard, shooting accuracy, biomechanics, training methodology, experimental results.

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Abstract: In basketball, the skill of accurately throwing the ball into the basket, particularly the technique of shooting using the backboard, is of great importance. This article presents the development history of the technique of shooting effectively using the backboard, its biomechanical model, and an analysis of foreign and local scientific sources. Additionally, the results of a pedagogical experiment conducted among 14–16-year-old female basketball players and the effectiveness of a specialized training program are highlighted. The study results showed that special training in shooting effectively using the backboard significantly increased shooting accuracy ($p < 0.01$). In conclusion, systematic teaching of the technique of shooting effectively using the backboard is scientifically and practically justified, as it enhances young athletes' shooting performance and provides additional advantages in competitions.

Introduction. Basketball is a team sport among modern sports that requires high technical and tactical proficiency, in which accurately throwing the ball into the basket is one of the key factors ensuring victory. In particular, effective shooting using the backboard can provide a significant advantage during the game. Factors such as the angle of incidence of the

ball on the backboard, its rotational velocity, and the force of the shot directly influence the outcome. In contemporary sports science, the in-depth study of these processes and their integration into training programs is considered highly relevant. In international practice, specialized technologies aimed at improving the technique of effective backboard shooting are being employed, including biomechanical analysis, video analytics, and virtual simulation-based training. Research indicates that shooting the ball at an angle of approximately 45–55° to the backboard, applying sufficient backspin, and selecting the correct contact point significantly enhance the success of backboard-assisted shots. Additionally, factors such as psychological preparation and rapid decision-making also impact shooting accuracy.

In recent years, within the national basketball system, the scientific optimization of backboard shooting efficiency has become one of the priority directions in strategies aimed at enhancing technical-tactical preparation. However, in practice, many local coaches have been observed to insufficiently apply scientific approaches when teaching the technique of effective backboard shooting. Existing training programs place limited emphasis on this element, and as a result, the skill of executing effective backboard-assisted shots is gradually being “forgotten” among young players. Likewise, in the national scientific literature, specialized studies on shooting using the backboard are extremely scarce. For instance, some local research has explored general methods for improving shooting accuracy (e.g., asymmetric exercises, imparting spin, etc.), yet fundamental investigations directly focused on refining the technique of effective backboard shooting are almost nonexistent.

In recent years, within the national basketball system, the scientific optimization of backboard shooting efficiency has become one of the priority directions in strategies aimed at enhancing technical-tactical preparation. However, in practice, many local coaches have been observed to insufficiently apply scientific approaches when teaching the technique of effective backboard shooting. Existing training programs place limited emphasis on this element, and as a result, the skill of executing effective backboard-assisted shots is gradually being “forgotten” among young players. Likewise, in the national scientific literature, specialized studies on shooting using the backboard are extremely scarce. For instance, some local research has explored general methods for improving shooting accuracy (e.g., asymmetric exercises, imparting spin, etc.), yet fundamental investigations directly focused on refining the technique of effective backboard shooting are almost nonexistent.

Research Aim. The aim of this study is to scientifically substantiate and develop a practical methodology for improving scoring efficiency by refining the technique of shooting using the backboard. This article analyzes both the theoretical and practical aspects of the

backboard-assisted shooting technique. The main section first addresses the history and technical foundations of the shot, followed by its biomechanical model and a review of relevant research in scientific literature. Subsequently, the article presents the details of experimental training conducted with 14–16-year-old female players, describes the specially designed training program, and analyzes the resulting data.

Main Section

The Technique and Historical Development of Backboard Use in Basketball. The technique of shooting effectively using the backboard (scoring via the basketball backboard) has been developing since the early stages of basketball. In the initial years, the baskets were firmly attached to walls, and spectators sometimes interfered by catching the ball. Consequently, beginning in 1895, special backboards were installed behind the baskets. Initially, wooden and metal panels were intended to prevent spectator interference, but over time they became elements that helped guide the ball. The rectangular mark (square) painted on the backboard became a focal point, promoting the emergence of effective backboard-assisted shots. In the evolution of basketball technique, backboard-assisted shooting has maintained an important role.

In the 1930s, J. Luisetti and K. Saylor introduced the one-handed jump shot, gradually replacing the static two-handed shot. By the 1950s, the use of the backboard had become widespread, and methods for directing the ball via the backboard expanded. The addition of the white square on the backboard allowed players to identify aiming points with greater precision, and backboard-assisted shooting became increasingly common.

However, since the introduction of the three-point line in the 1980s, teams began focusing more on long-range shots. As a result, mid-range techniques, including effective backboard-assisted shooting, were less frequently utilized and somewhat marginalized. In the context of contemporary elite players' powerful dunks and rapid combination plays, shooting off the backboard may even be perceived as an "old-fashioned" technique. Nonetheless, many experts emphasize the necessity of retraining players in backboard-assisted shooting, as it remains a reliable method for executing accurate shots under strong defensive pressure and in time-constrained situations.

In modern basketball, effective backboard-assisted shooting is predominantly executed from mid-range at an angle of approximately 45°. The backboard is also actively utilized in lay-up shots (close-range one-handed shots in motion). Conversely, for long-range (three-point) shots or shots taken directly in front of the basket, use of the backboard is generally considered ineffective.

According to the literature, backboard-assisted shooting is particularly advantageous in the following situations: (1) when a player approaches the basket from the wing at an angle of 30–45°, creating an acute angle for a direct shot; (2) when a defender blocks a direct shot but allows a shot via the backboard; and (3) during a lay-up, when it is necessary to soften the ball's trajectory by deflecting it off the backboard. In these scenarios, a shot directed via the backboard is more likely to descend smoothly into the hoop, increasing the probability of scoring.

The process of effective backboard-assisted shooting is explained through the principles of mechanics and geometry. Key parameters in directing the ball off the backboard include the flight trajectory, angle, spin, and the dynamics of the collision with the backboard. Ideally, if the collision is perfectly elastic, the angle at which the ball strikes the backboard equals the angle of reflection. In practice, due to the ball's backspin and the properties of the backboard surface, the reflection angle is typically smaller than the incidence angle.

Backspin is an integral component of effective backboard shooting, as it reduces the horizontal velocity of the ball upon contact with the backboard, thereby “softening” the shot. Studies indicate that imparting backspin at a frequency of approximately 3 rotations per second (3 Hz) is optimal and enhances shooting success. The spin slows the ball after it rebounds from the backboard, increasing the likelihood of it descending smoothly into the hoop. Consequently, highly skilled players focus on generating strong backspin through precise wrist action during the shot.

The material and rigidity of the backboard also play a critical role. The backboard functions as a shock absorber, partially dissipating the ball's excess energy and thereby assisting in directing imperfectly executed shots toward the basket. For example, while a ball bouncing on a parquet floor can return approximately 91% of its energy, on the backboard this value is around 85–88%, meaning some energy is absorbed. As a result, the backboard reduces the ball's speed and helps prevent it from rebounding out of the hoop. In this sense, the backboard is forgiving of shots executed with slightly incorrect force, increasing the likelihood that the ball will still score.

Successful backboard-assisted shooting also requires precise selection of the target point and shot angle. Geometric analyses indicate that if the ball is directed to a specific point on the backboard, it will rebound toward the center of the hoop. Prominent studies have identified “sweet spots” within the square marked on the backboard, where the probability of the ball entering the hoop is highest. These points are generally located near the lower inner corners of the square (left and right), forming a V-shaped configuration. Naturally, if the ball

strikes slightly outside these zones, it may not be directed to the center of the hoop, resulting in a missed shot. Therefore, players are trained to aim at the correct point and execute the shot with the appropriate trajectory to maximize accuracy.

Analysis of Scientific Literature and International Research

A review of the literature on effective backboard-assisted shooting indicates that many international experts have shown interest in reviving this “neglected” technique. Researchers at the University of North Carolina (Silverberg et al., 2011) conducted a computer simulation study that scientifically confirmed the advantages of backboard-assisted shooting. The study demonstrated that for players positioned within 3.5 meters of the basket, directing the ball off the backboard increased shooting success by up to 20% compared to direct shots. This advantage was particularly pronounced for wing positions (45° angles). The researchers attributed this to the presence of optimal “V-shaped” points on the backboard and recommended targeting these points. Additionally, Silverberg and colleagues proposed a training exercise in which players aim at an imaginary line located 8.5 cm behind the backboard, helping develop the skill of accurately directing the ball to the upper part of the square.

An article published by AIP Inside Science in 2011 also presented a “geography” of backboard-assisted shooting, indicating that within 4.5 meters (15 feet), such shots were significantly more effective than standard jump shots. The article cited Larry Hantern, a coach at Western Carolina University, who noted that modern players often focus on powerful dunks and long-range shots, neglecting backboard-assisted shots. However, the scientific evidence demonstrates that this technique cannot be ignored—when executed correctly, it provides additional scoring opportunities in games.

Researchers from the former Soviet Union and CIS countries have also shown interest in backboard-assisted shooting. For instance, Russian scientist N.S. Morozova, in her 2009 dissertation, found that the proportion of backboard-assisted shots in team attacks ranged from 17% to 35%, and she emphasized that these shots were more consistent than regular attempts. She developed a specialized methodology for selecting optimal target points on the backboard and training players to aim accordingly. Implementation of this methodology led to an approximate 10% increase in shooting accuracy among young players. This work represents an important reference demonstrating the effectiveness of a comprehensive approach to backboard-assisted shooting.

In Uzbekistan, there is a notable scarcity of fundamental scientific research on the effective use of the volley (shit) in executing strikes. Domestic studies have primarily focused

on general shooting techniques and methods to improve accuracy. In particular, scholars such as Sh. Mamatqulov and D. Norkulov have conducted experiments on enhancing shooting accuracy across various age groups. Some studies have recommended applying backspin to the ball or using non-standard exercises to improve precision. However, research specifically dedicated to striking effectively using the volley is almost entirely absent in the national literature.

In recent years, this topic has been increasingly addressed in nationwide coaches' seminars. Notably, within the framework of the "Lider-Trener" program (2024) developed by D.R. Norkulov and colleagues, specialized observations and tests on effective volley utilization were conducted, confirming once again that volley strikes yield results 15–20% higher than direct strikes over certain distances. The program also demonstrated that young players who regularly practiced exercises focused on effective volley strikes achieved significantly greater accuracy near the penalty area compared to a control group.

In conclusion, it can be stated that scientific sources have thoroughly elucidated the theoretical foundations of effective volley (shit) strikes and have demonstrated their practical benefits through statistical evidence. The most pressing task now is to integrate these scientific findings into national sports practice, that is, to develop and implement methodological guidelines for coaches and instructors on teaching effective volley striking. Below, one such approach is presented, illustrated through a pedagogical experiment conducted by the author with a team of girls aged 14–16.

Experiment Conducted Among 14–16-Year-Old Female Basketball Players

The aim of the experiment was to teach the technique of effective volley (shit) strikes through specialized training sessions and to empirically evaluate its effectiveness. The research subjects consisted of female basketball players aged 14–16 from sports schools in the Fergana Valley. Through random selection, 20 participants were assigned to the experimental group (EG) and 20 to the control group (CG). Once the groups were formed, an initial test was conducted with all participants in September 2025. The following criteria were evaluated during the test trials:

Static shooting accuracy (without defenders): The number of successful shots scored out of 10 attempts from various positions using the volley.

Accuracy in small-sided game situations (2×2 and 3×3): The percentage of successful strikes executed using the volley.

Effectiveness under defensive pressure (1×1 situation): Success rate of volley strikes when facing a defender.

Physical performance indicators: Vertical jump height, passing power, and other relevant measures (for supplementary information).

Initial Test Results: The baseline test results were nearly identical for the experimental group (EG) and the control group (CG). For example, in static shooting conditions, the EG achieved an average accuracy of approximately 61% (6.1/10 attempts), while the CG recorded around 59% (5.9/10 attempts). Similarly, in small-sided game situations, the results of the two groups were comparable, with no statistically significant differences observed ($p > 0.05$). This indicates that at the start of the experiment, both groups possessed equivalent shooting accuracy, providing an unbiased basis for evaluating the effects of the new methodological intervention in subsequent stages.

Training Intervention: From September 2025 to February 2026, the EG underwent specialized training sessions focused on effective volley (shit) strikes. The CG continued with the standard training program and did not receive any specific tasks related to volley strike technique. The specialized program lasted six months, comprising five training sessions per week. Both groups trained simultaneously under identical conditions; the key difference was that in each session, the EG devoted dedicated time to practicing the elements of effective volley striking. Throughout the training period, both groups were continuously monitored to ensure adherence to the schedule and to prevent overloading.

Interim Monitoring and Post-Test Evaluation: Interim assessments were conducted every three weeks (monthly) to track progress. In February 2026, the final post-test was administered under the same conditions as the initial test: each participant performed strikes from designated positions, and their accuracy was recorded. The final results were compared between the experimental group (EG) and the control group (CG) and subjected to mathematical and statistical analysis. Mean values, standard deviations, and Student's t-tests were calculated, with significance assessed at $p < 0.05$.

Results. The outcomes of the experiment demonstrated that the specialized training program for effective volley (shit) strikes had a significant positive effect. Accuracy among players in the EG increased markedly, with the difference between pre- and post-test scores being statistically significant ($p < 0.01$). In contrast, the CG, which continued standard training, did not exhibit such a notable improvement. Table 1 presents a comparison of the two groups' results across selected indicators.

1st Table

Comparison of Shooting Accuracy Results Between Experimental and Control Groups (%)

Indicator (Test Condition)	Experimental Group – Initial	Experimental Group – Final	Control Group – Initial	Control Group – Final
Accuracy of Static (Unopposed) Shots	61% ± 5%	76% ± 4%	59% ± 6%	63% ± 5%
Accuracy in 2×2 Game Situations	Fifty% ± 5%	65% ± 6%	49% ± 5%	53% ± 5%
Accuracy Against 1×1 Defensive Pressure	26% ± 4%	40% ± 5%	25% ± 5%	28% ± 4%
Overall Accuracy of Bank Shot Usage (All Conditions)	46%	60%	45%	48%

Note: Static condition – unopposed free throws; 2×2 – two offensive players against two defenders; 1×1 – shots taken against a single defender. In the final results, the experimental group outperformed the control group across all criteria ($p < 0.01$).

As shown in the table above, the experimental group (EG) significantly improved their performance across all test conditions. For example, in the static shooting exercise, EG players increased their accuracy from an initial ~60% to ~76% by the end of the intervention, whereas the control group (CG) showed only a modest improvement from ~59% to 63%. Similarly, in small-sided game situations (2×2), the accuracy of volley strikes in the EG increased by approximately 15%, reaching ~65%, while the CG showed only a 4% improvement (~53%).

The most pronounced difference was observed under 1×1 defensive pressure: the final accuracy of volley strikes in the EG reached ~40%, compared to only ~28% in the CG. These results indicate that, following the specialized training, the players were considerably more confident and effective when executing volley strikes even under complex conditions. Statistical analysis confirmed that the final differences between the EG and CG were significant across all criteria ($p < 0.01$), demonstrating that the observed improvements were not due to chance but were a direct result of the applied training methodology.

Another important observation during the experiment was the positive change in the experimental group (EG) players' attitudes toward and confidence in executing effective volley (shit) strikes. In initial interviews, many of the girls considered volley shooting to be of limited utility and exhibited low self-confidence. By the end of the training program, however, they expressed readiness to apply this technique in actual game situations. Survey results indicated that the EG players significantly improved their understanding and practical skills in executing effective volley strikes—for example, the proportion of positive responses to the statement, “I am well acquainted with methods for effective use of the basketball volley,” increased notably. Furthermore, EG coaches reported that, following the specialized training, the girls were able to secure several crucial points in matches by correctly utilizing volley strikes.

In conclusion, the experiment demonstrated that targeted instruction in effective volley striking statistically and practically enhanced the shooting accuracy of young basketball players. These findings are consistent with prior research; for instance, previous studies have shown that a 10-week specialized shooting program produced substantially higher effectiveness compared to standard training. Our study confirmed this effect in the context of a girls' basketball team.

Training Structure and Methodologies for Enhancing the Effectiveness of Volley (Shit) Strikes

Within the framework of the above experiment, a specialized training program was developed for the experimental group. The program spanned a 9-week cycle (total duration approximately 2 months, with interim monitoring over 3 months) and included five training sessions per week. The sessions were conducted according to the standard sports school schedule (five times per week), with each session lasting 90 minutes. Table 2 presents a sample structure of a typical training session.

2nd Table

Structure of a Specialized Training Session for Effective Use of the Backboard (90 minutes, Experimental Group)

Training Phase	Content	Time (min)
Introduction (Warm-up)	Light jogging, general and sport-specific stretching exercises. Team drill: 5 minutes of passing and lay-up series (using the backboard).	15
Main Part - 1 (Technique)	Technique of Effective Backboard Shooting: Drills focused on teaching accurate shots from designated points using the backboard. For example, the "Eyeglass" method – aiming at the inner edges of a square mark as a visual guide ("eyeglass") for precise shots. Each wing position: 10 repetitions.	30
Main Part - 2 (Practice)	Application in Game Situations: 2×2 small-sided game – scoring is allowed only through effective backboard shots. Each possession includes at least one pass and a cutting movement before shooting at the backboard. Defensive players provide real resistance. Additionally, the "1×1 with Defender" drill – the player must quickly choose (≤1 second) between a bank shot or direct shot under defensive pressure.	30
Final Part (Consolidation)	Free Throws and Mid-Range Shots: Each player performs 5 free throws while fatigued (at least 2 using the bank). Afterwards, light jogging to cool down, followed by brief analysis and discussion of the day's errors and achievements in effective backboard shooting.	15

Within the program, the content of the training sessions was progressively intensified on a weekly basis. During the initial weeks, the primary focus was on developing proper technique in static conditions. Players were taught to direct the ball precisely toward the square

target “aperture,” correctly position and flex the wrist, and apply backspin. For example, in the exercise called “Steady Gaze,” the girls practiced targeting a designated point on the volley from a distance of 1.5–2 m, pausing for 0.5 seconds to focus before executing a soft backspin shot (aiming for $\geq 85\%$ accuracy).

In subsequent stages, both distance and angles were increased. Drills included V-point shots from wing positions (45°) at 3–4 m, “soft bank” exercises from short-corner (baseline) positions, and arc shots to the hoop from elbow zones (free-throw line angle). Accuracy criteria were established for each drill—for instance, a minimum of 60% successful shots was required for the elbow-zone drill.

During the final weeks, the sessions were oriented toward game-like situations. The girls played 2×2 and 3×3 small-sided games in which only effective volley strikes were counted, thereby accelerating decision-making under realistic conditions. This format, referred to as the “only volley” game, required that points be scored exclusively using the volley. Additionally, in drills involving a defender, the coach used visual signals to prompt decisions within ≤ 1 second: if the coach raised their hand, the player executed a volley strike; if the hand was lowered, a direct shot was taken. Such exercises developed the players’ ability to quickly choose between a volley or a direct shot depending on the game situation.

At the end of each session, a brief control test or competition element was included to allow the players to assess their progress. For example, in the “Hotspot Challenge,” each player took five shots from four designated points, and the point with the highest number of successful strikes was recorded.

Overall, the developed methodology was based on an integrated approach, combining the refinement of technical elements with physical and psychological exercises. The training load was kept equal for both groups; however, the experimental group (EG) allocated a specific portion of that load to practicing effective volley strikes. Following recommendations from scientific literature, particular emphasis was placed on the most effective “sweet spots”—namely, the wing areas between the free-throw line and the three-point range.

Throughout the sessions, players’ heart rates and signs of fatigue were monitored, and training loads were adjusted as necessary. The significance of this methodology lies in its structured progression: it gradually increased complexity while transitioning toward realistic game situations. Initially, shooting technique was developed as a discrete element; subsequently, it was integrated into gameplay. This approach enabled the players not only to execute technically correct shots but also to understand when the use of effective volley strikes would be most advantageous.

By the end of the program, EG coaches observed that the girls no longer hesitated to use volley strikes in open situations and, in some cases, initiated the technique themselves. This indicates the practical effectiveness of the methodology.

Conclusion. Theoretical foundations of effective use of the backboard in shooting: Although initially introduced for defensive purposes, the basketball backboard has over time become a tool to assist in ball direction. Scientific literature has identified the optimal conditions for effective backboard use (45° angle, 3–4 m distance, backspin, and “sweet spot” zones). Theoretically, proper application of this method significantly increases the likelihood of successful shots.

Biomechanics and technique: The success of backboard-assisted shooting is largely determined by backspin and correct angle. The backboard reduces ball speed, softens the shot, and partially compensates for force errors. Therefore, players must be trained to strike the backboard at the correct point, with sufficient backspin, and along a high trajectory.

Findings from scientific research: Both foreign and local studies confirm the practical effectiveness of backboard-assisted shooting. For example, NC State research demonstrated that using the backboard can provide up to a 20% advantage for shots within 12 feet; Morozova’s study showed a 10% improvement in accuracy through targeted training; and observations from Uzbek specialists indicated that without specific training, backboard techniques tend to be forgotten. These findings suggest a strong alignment between scientific approaches and practical experience.

Experimental results: A six-month pedagogical experiment conducted with 14–16-year-old girls demonstrated that specialized backboard shooting training significantly improves accuracy and effectiveness. The experimental group improved shot accuracy across all conditions ($p < 0.01$), whereas the control group showed no comparable gains. Moreover, the specialized program enhanced players’ confidence in using the backboard.

Methodological recommendations: Teaching effective backboard shooting should be integrated into the national sports training system. It is recommended to include specialized backboard shooting exercises at least 1–2 times per week in training plans for children and adolescent teams. Training should progress stepwise: starting with static backboard shots, followed by shots in motion, and finally against defensive pressure. Visual markers (e.g., a square “target”) on the backboard are useful for illustrating optimal angles and points. Players should learn to focus on the designated point and apply gentle backspin on every shot.

Additionally, small-sided games and competitions should be used to develop the ability to apply backboard-assisted shooting in real-game situations. The methodology developed and

tested based on these recommendations can be implemented in sports schools and team practice. This approach enriches young players' shooting arsenal and provides a clear advantage in critical situations.

The scientific findings from this study have been discussed at local seminars and highly valued by coaches. Future research is planned to explore this topic further, particularly focusing on psychological preparation and decision-making speed in the context of effective backboard shooting.

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