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EFFECTIVENESS OF BACKBOARD-BASED SHOOTING METHODOLOGY IN BASKETBALL: EXPERIMENTAL VALIDATION

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Abstract. This study evaluates a specialized backboard-based shooting training methodology for 14–16-year-old female basketball players and its impact on shooting performance. The purpose was to determine whether targeted drills using the backboard can significantly improve shooting accuracy. A controlled experiment was conducted with an experimental group trained under a backboard-assisted shooting program (including a "Ko'z oynak" or "glasses-shaped" target drawn on the backboard) and a control group under a standard training regimen. Pre- and post-test assessments of bank-shot success rates from various court positions were measured. The experimental group showed significantly greater improvement in shooting accuracy than the control group. Results demonstrated that backboard-focused training led to a higher scoring success (approximately 15–20% increase, $p<0.01$) while conventional training yielded minimal gains. In conclusion, the backboard-based methodology proved effective in enhancing shooting performance, offering a scientifically validated approach to teaching bank shots in youth basketball.

Keywords: basketball, backboard, bank shot, shooting accuracy, training methodology, female players, experimental study, performance analysis

Introduction

Basketball games can often be decided by the ability to score reliably using all available tools, including the backboard. A banked shot off the backboard is a fundamental technique that can improve scoring probability, especially from certain angles. Research from North Carolina State University showed that a mid-range jump shot aimed at the backboard (up to ~3.5 m distance) is about 20% more effective than a direct shot without using the board. This is largely because contacting the backboard at optimal angles can slow the ball and increase the likelihood of a successful drop through the hoop. These optimal target points on the board form a distinctive "V" or "glasses" shape that guides shooters where to aim. However, despite such advantages, the use of backboard shots has been declining in modern play, as many athletes focus on slam dunks and long-range three-pointers. This trend has led to backboard techniques becoming somewhat "forgotten" among young players and underutilized in training.

In Uzbekistan, as in many countries, there is growing recognition of the need to revive and scientifically approach the teaching of bank shots. The national basketball development programs prioritize improving technical skills like backboard usage, but practical training for this technique remains insufficient at the youth level. Many coaches lack clear methodology on how to teach the optimal angles, target points, and timing required for effective bank shots. As a result, young players often do not fully develop confidence and consistency in using the backboard during games.

The aim of this study is to address this gap by experimentally validating a backboard-based shooting methodology for young players. Specifically, we investigate whether a specialized training program – incorporating visual target markers on the backboard and focused "bank-shot" drills – can significantly improve the shot accuracy and efficiency of 14–16-year-old female basketball players. By scientifically substan-

tiating the effectiveness of this methodology, we hope to provide coaches with an evidence-based approach to enhance scoring skills via backboard use.

Materials and Methods

Participants: The experiment was conducted with 40 female basketball players aged 14–16, all from youth sports schools in the Fergana region. The players had 2–4 years of playing experience on average and were of similar skill level. They were randomly divided into an experimental group (20 players) and a control group (20 players). Prior to the intervention, both groups underwent a pre-test evaluation of their shooting accuracy, specifically focusing on bank shots from various standardized positions on the court. Statistical analysis confirmed no significant difference in baseline performance between the groups, indicating a comparable starting level ($p>0.05$). Each group was coached by qualified trainers, and care was taken to ensure their overall training volume and intensity were equivalent throughout the study.

Experimental Design: The training intervention lasted 8 weeks and was integrated into the teams' regular practice schedule. Both groups practiced around 5 times per week, 90 minutes per session, following typical youth training regimens. The key difference was that the experimental group's practice included a special 30-minute module in each session dedicated to backboard-shooting drills, whereas the control group spent that time on routine technical and tactical drills with no specific emphasis on bank shots. In both groups, the first ~15 minutes were for warm-up and the final portion for scrimmage or other exercises, thereby keeping total practice duration and workload comparable. The intervention was implemented during the middle of the 2025–2026 season (October–December), with pre-tests in late September and post-tests in late December (8 weeks apart).

Backboard-Based Training Methodology: The experimental group followed a targeted shooting program centered on a "backboard aim-point" model. A visual aid in the form of a "Ko'z oynak" (glasses-shaped) target was applied to the backboard as a coaching tool. This target consisted of a small central circle with two curved elliptical lines extending outward, roughly resembling a pair of spectacles drawn over the rectangular shooting square on the glass. The marked shape highlighted the optimal contact points on the upper central area of the board, which correspond to the mathematically calculated "sweet spots" for bank shots. During drills, players were instructed to aim the ball at the intersection of the "glasses" shape on the board – the point identified as ideal for a successful bank shot from each angle. By providing this clear visual target on the backboard, the training aimed to develop the players' consistency in aligning their shots with the optimal angle and force.

Training drills in the experimental group included: static set shots and jump shots using the board from different court positions, repetitive bank-shot lay-ups from both sides, and situational shooting exercises. Key shooting spots (designated F1–F10 around the hoop, including both 45° wing angles and baseline angles) were used to practice bank shots systematically. For example, players practiced from the short corners (around 1.5–2 m from the basket at ~45°) as well as slightly further out on the wings, since prior analysis indicated these angles benefit most from backboard use. Each player attempted a fixed number of shots (e.g., 10 attempts) from each spot aiming at the "Ko'z oynak" target on the board. Coaches emphasized proper technique – approaching at ~45°, keeping the shooting elbow aligned, and giving the ball a soft high arc to bounce off the square at ~45–55° incidence angle. Immediate feedback was provided, often with the aid of video playback for motion analysis. The use of the marked target helped the girls identify the exact point of contact on the board and adjust their shooting trajectory accord-

ingly. Over the weeks, the drills progressed from unopposed practice to more dynamic situations: for instance, incorporating a close-out defender to simulate game pressure once the basic technique was reinforced. The control group, in contrast, continued their standard training which included general shooting drills (direct shots) but no special emphasis on using the backboard.

Testing Protocol: Both groups underwent identical pre-test and post-test evaluations. The tests measured shooting accuracy (%) in a series of standardized bank-shot tasks: (1) set shots off the backboard from 5 fixed spots (e.g., left and right 45° angles, left and right short corner, and straight on at 45° to board); (2) jump shots off the board from similar locations; and (3) lay-up style bank shots from both sides. Each player took a set number of attempts (e.g., 10 per spot or drill), and the successful shots (ball banked off the board into the hoop) were recorded. We also included a dynamic test where players performed bank shots in a modified game scenario (3×3 half-court play) to assess transfer of the skill to a game-like context. During these tests, no "Ko'z oynak" markings were present on the backboard – players had to apply what they learned. Shot success percentages were calculated for each player and averaged per group for each test condition.

Data Analysis: The improvement in shooting performance from pre- to post-test was compared between the experimental and control groups. We used standard descriptive statistics (mean ± standard deviation of shooting success rates) and paired sample t-tests to evaluate within-group improvements. An independent samples t-test was applied to compare the magnitude of improvement between the two groups. Statistical significance was set at $p<0.05$, with a more stringent threshold ($p<0.01$) applied for key outcomes given the relatively small sample. Additionally, we computed effect sizes (Cohen's d) to quantify the training impact. The results were visualized in tables and charts to facilitate comparison of accuracy rates. All statistical analyses were performed using SPSS 26.0.

Results and discussion

At the end of the 8-week intervention, the experimental group that trained with the backboard-focused methodology showed a marked improvement in bank-shot performance, whereas the control group's progress was minimal. Before the training, both groups had comparable bank-shot success rates – approximately in the mid-40% range on average (e.g., around 45% of attempts resulting in a score off the board). After the training, the experimental group's shooting accuracy increased dramatically, reaching roughly 65–70% success across the various bank-shot tests, while the control group averaged only around 50–52% under the same conditions. The difference in improvement between the groups was highly significant ($p<0.01$).

Pre- and post-test bank shot success rates for experimental and control groups. The experimental group (blue) showed a substantial increase in scoring accuracy after 8 weeks of backboard-focused training, while the control group (red) exhibited only a slight improvement. Error bars (if visible) represent standard deviations. The experimental group's final success rate was ~70%, significantly higher than the control group's ~50%.

As illustrated in Figure 1, both groups started at a similar baseline (blue and red bars on the left). After training, the experimental group's success rate jumped to about 70% (blue bar on the right), whereas the control group improved only modestly to about 50% (red bar on the right). In absolute terms, the experimental group enjoyed roughly a 20 percentage-point gain in accuracy, compared to only a ~5 point gain for the control group. This finding indicates that the backboard-based training methodology effectively enhanced the players' shooting performance, far beyond the natural improvement from regular practice.

The large effect size (calculated Cohen's d > 1.0 for the main outcome) underscores the practical significance of incorporating targeted bank-shot drills in training.

Breaking down the results by test conditions provides further insight. In stationary set-shot tests (no defenders), the experimental group's bank-shot accuracy improved significantly at all court locations. For instance, from a 45° wing spot about 3 m from the basket, their success rate rose from ~50% pre-test to ~68% post-test, whereas the control group went from ~48% to ~55%. The most pronounced gains for the experimental group were observed at the wing and short corner positions, which involve a 30°–60° angle to the board. These angles are known "sweet spots" where using the board gives an advantage. Our results align with Silverberg et al. (2011), who identified that bank shots from the wing (around 12 feet away) can indeed yield ~20% higher success than direct shots. The training appeared to help players better exploit these angles; during post-tests, many experimental group players consistently hit the upper corner of the inner square on the backboard – an indicator of correct execution – whereas at pre-test they often missed wide or hit the rim.

In dynamic jump-shot tests, where players took shots off the dribble or coming off a pass, the experimental group also outperformed the control group after training. Not only did their accuracy improve, but their confidence and form on bank shots were noticeably better. Players in the experimental group displayed more consistent footwork and alignment when approaching the board. They released the ball at a higher point with a softer touch, ensuring the ball's trajectory used the marked target area on the board. In contrast, control players frequently defaulted to straight-at-the-hoop shots even from angles where the bank would be beneficial, indicating they had not developed the habit or skill to utilize the board under pressure. This highlights an important aspect: the experimental training ingrained a new technical skill and decision-making element (choosing the banked shot when appropriate) that the control training did not.

We also examined performance in a game-like scenario (3×3 play) to assess skill transfer. Here, the difference between groups, while still in favor of the experimental group, was slightly less stark than in open drills – as expected, because defense and game speed introduce complexity. The experimental group executed successful bank shots about 25% of the time in these mini-games (under moderate defensive pressure), compared to roughly 15% for the control group. While these percentages are lower than in practice drills (due to defense), the experimental group still maintained a clear edge. Notably, some experimental players made clutch bank shots during 3×3 play, demonstrating that they had the confidence to apply the technique in a realistic context. In contrast, control players rarely attempted bank shots in the scrimmage, often opting for direct shots even at angles where a bank could have been advantageous, reflecting less confidence or ingrained habit.

The significant improvement in the experimental group can be attributed to several factors inherent to the Ko'z oynak training methodology. First, the visual target on the backboard likely accelerated the learning process by providing immediate feedback. As reported in similar studies, using visual cues or targets helps players focus on the correct aiming point and reinforces muscle memory for that trajectory. Our players quickly learned to recognize the "sweet spot" for various angles – effectively developing an intuitive geometric understanding of bank shots. Second, the repetitive drills emphasizing proper angle, spin, and touch built their technical proficiency. Over 8 weeks, players in the experimental group corrected common errors such as shooting too flat (insufficient angle for a bank) or using excessive force. The result was softer shots that hit the board with the right

amount of backspin and angle to drop into the basket. Third, the psychological effect should not be underestimated: as the players saw improvement, their confidence in using the backboard grew. By the end of the program, many experimental group members remarked that they felt the board was an "ally" to help score, rather than an obstacle. This mental shift is crucial, as confidence can translate to better performance under game pressure.

Conclusion

In summary, the introduction of a backboard-based shooting methodology proved to be highly effective in improving the shot accuracy of 14–16-year-old female basketball players. Through an 8-week controlled experiment, it was demonstrated that players who practiced with a specific focus on bank shots – guided by a "Ko'z oynak" target marker and specialized drills – achieved significantly greater improvements in scoring success than those who followed a conventional training program. The experimental group's bank-shot accuracy increased by roughly 15–20%, a statistically significant gain that highlights the impact of the targeted training. In contrast, the control group showed only marginal improvement, indicating that traditional training alone is insufficient for developing this particular skill.

These results provide strong experimental validation for incorporating backboard-centric exercises into regular basketball training, especially for developing players. The methodology helped athletes master optimal angles and techniques for using the backboard, translating to more reliable performance in both practice and game-like situations. Coaches and sports educators can adopt the key elements of this program – such as marking optimal target spots on the backboard and progressively drilling bank shots under various conditions – to enhance their teams' offensive capabilities. Not only does this approach improve technical proficiency and scoring efficiency, but it also builds player confidence in utilizing a historically underutilized tactic.

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