

**MENTAL ENLIGHTENMENT SCIENTIFIC –
METHODOLOGICAL JOURNAL****MENTAL ENLIGHTENMENT SCIENTIFIC –
METHODOLOGICAL JOURNAL**<http://mentaljournal-jspu.uz/index.php/mesmj/index>**METHODOLOGY FOR TEACHING TECHNICAL AND TACTICAL MOVEMENT
ELEMENTS TO BADMINTON PLAYERS AT THE INITIAL TRAINING STAGE****Jasur Jumanazarovich Mahmaraimov**

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ABOUT ARTICLE

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Abstract: This study investigated the effectiveness of a station-based training methodology aimed at improving the technical and tactical preparedness of young badminton players during the initial training stage. The research focused on assessing the impact of structured station exercises on stroke accuracy, movement coordination, decision-making speed, and the ability to apply tactical actions during competitive play. The developed training program consisted of several specialized stations, each designed to target specific technical and tactical skills. The volume, intensity, and work-to-rest ratios of exercises were planned according to the age-related characteristics and training level of the participants. A pedagogical experiment was conducted to evaluate the effectiveness of the proposed methodology. The results demonstrated that systematic implementation of station-based training significantly improved the athletes' ability to perform technical strokes accurately and consistently. Furthermore, the training approach positively influenced special physical fitness, agility, coordination abilities, and the integration of technical and tactical actions under game conditions. The findings indicate that station-based training provides an effective pedagogical tool for optimizing the

training process of young badminton players and enhancing their overall sports performance. The study highlights the practical value of incorporating structured station exercises into long-term athlete development programs in badminton.

Introduction. The increasing level of competition in international badminton tournaments worldwide necessitates the development and implementation of new organizational and practical approaches aimed at achieving success at the highest level and winning gold medals in major international competitions. This requires the establishment of specialized scientific schools focused on the preparation of highly qualified, talented, and competitive badminton players, the optimization of training loads according to athletes' age, gender, functional status, and physical capacities, as well as the development of modern and innovative training methodologies. Badminton has become an important factor not only in promoting physical development but also in fostering personal and moral growth. Comprehensive athlete preparation, particularly the development of technical and tactical skills in young badminton players through the application of integrated training exercises, plays a crucial role in enhancing game performance and competitive effectiveness. Therefore, the search for effective training methods aimed at improving the technical and tactical proficiency of young athletes remains one of the priority areas of contemporary sports science and badminton coaching practice.

Materials and Methods. Effective teaching of technical and tactical actions in badminton and the scientific assessment of their developmental dynamics require athletes to thoroughly master fundamental movement patterns and stroke techniques. The level of technical preparedness serves as a foundation for the subsequent development of tactical skills and has a direct impact on game performance and competitive results. Therefore, technical training is considered one of the key components in the long-term development of badminton players. In the present study, the most frequently used technical actions and stroke types in badminton were identified and analyzed. Based on their specific characteristics and practical significance, a specialized training methodology aimed at improving technical and tactical performance was developed and implemented. The proposed methodology focused on enhancing the accuracy, consistency, and effectiveness of technical skills while simultaneously promoting the integration of technical execution with tactical decision-making during play.

During the study, the fundamental technical elements characteristic of badminton players across all age categories were selected to assess technical preparedness. This approach

enabled not only a systematic evaluation of technical skills but also an assessment of each athlete's technical proficiency while taking individual characteristics into account. In selecting the training exercises, priority was given to activities that facilitate the development of fundamental badminton techniques and provide the foundation necessary for the effective acquisition of more complex technical and tactical actions in the future. Furthermore, the selected exercises contributed not only to the development of key physical qualities, such as agility, speed, strength, and sport-specific endurance, but also to the improvement of movement coordination, spatial awareness, and rapid decision-making abilities in game situations. These exercises strengthened the interrelationship between general and sport-specific training components, thereby promoting the stable development of technical mastery. Based on an analysis of the training process at the initial stage of badminton preparation, a station-based training methodology was developed, emphasizing the sequential and progressive acquisition of technical skills. The methodology consisted of eight specialized training stations, each designed to independently develop and refine a specific technical element of badminton performance. This approach enhanced the systematic organization of the training process, facilitated the regulation of training loads, and increased athletes' motivation and engagement during practice sessions. To evaluate the effectiveness of technical training, a maximum score of 30 shuttlecock strokes was established for each exercise and considered equivalent to 100% performance. At both the beginning and the conclusion of the study, the number of shuttlecocks accurately directed into predetermined target zones was recorded, and the results were expressed as percentages. The following technical actions were selected for assessment:

Accuracy of performing 30 side-court Drive strokes (flat shots) (%);

Accuracy of performing 30 defensive Clear strokes (%);

Accuracy of performing 30 Smash strokes (%);

Accuracy of performing Drop Shot strokes from the rear court to the front court area (%);

Accuracy of performing 30 Backhand strokes (%);

Accuracy of performing 30 attacking Drive/Flick strokes (%);

Accuracy of serving with the forehand (open racket face) technique (%);

Accuracy of serving with the backhand (closed racket face) technique

In the developed station-based training program, the total workload and duration across eight training stations were adjusted to approximate the average match duration observed in badminton competitions. This approach ensured that training loads were aligned with the

demands of competitive play and facilitated the effective transfer of developed physical and technical preparedness into real game performance. The scientifically structured distribution of training loads during station-based sessions had a positive impact on the comprehensive development of both general and special physical qualities in young badminton players. As a result, this methodology contributed to a more effective integration of physical conditioning and technical skills, thereby enhancing the overall readiness of athletes for competitive performance.

To achieve the objectives of the study, eight specialized stations based on a station-based training methodology were developed and implemented in practice. The exercises performed at each station were aimed at developing key movement actions that play an essential role in the technical and tactical performance of badminton. In selecting the exercises, priority was given to improving athletes' technical skills, enhancing movement coordination, developing sport-specific physical qualities, and forming game-specific motor patterns characteristic of competitive badminton. At each station, the average work duration was 60 seconds, of which 50 seconds were allocated to the main exercise performance and 10 seconds to short-term recovery and transition to the next station. This work-to-rest ratio enabled athletes to optimally tolerate training loads, maintain high exercise intensity, and perform technical elements with greater accuracy and quality. In addition, the short recovery intervals activated the functional capacities of the cardiovascular and respiratory systems, thereby increasing the overall effectiveness of the training session. The total workload and duration of the eight-station training program were closely aligned with the average duration of competitive match play in badminton. As a result, the transfer of physical and technical preparedness developed during training into competitive performance conditions was significantly enhanced, improving athletes' adaptability to game situations. The systematic and scientifically based distribution of training loads across stations facilitated the comprehensive development of both general and special physical fitness in young badminton players. In particular, improvements were observed in speed, agility, coordination abilities, strength endurance, and specific endurance, alongside the refinement of accurate technical execution skills. Furthermore, the station-based training approach contributed to maintaining athletes' performance capacity over prolonged periods, expanding their functional capabilities, and increasing resistance to fatigue. Overall, the implementation of the station-based training methodology proved to be an effective pedagogical tool for the simultaneous development of technical-tactical preparedness and sport-specific physical qualities in young badminton players. This approach ensured closer

alignment of the training process with competitive demands and provided an important methodological foundation for improving future athletic performance outcomes.

In particular, the athletes demonstrated a significant improvement in maintaining a high level of working capacity during training sessions, resistance to fatigue, the ability to perform technical actions with precision, and the stability of technical and tactical execution throughout gameplay. As a result, the findings of the pedagogical experiment confirmed that the developed station-based training methodology is an effective means of enhancing the technical preparedness of young badminton players.

Results and Discussion. The results obtained at the beginning and at the end of the experiment were statistically analyzed in order to determine changes in the level of technical and tactical preparedness of young badminton players. The research results demonstrated a positive and statistically reliable improvement across all test exercises during the experimental period. The accuracy of performing 30 side-court flat (Drive) strokes increased from $5.8 \pm 0.9\%$ at the beginning of the experiment to $12.75 \pm 1.82\%$ at the end. The absolute increase was 6.95 units, and the relative increase was 42.5%. The calculated t-value was 5.86 ($P < 0.001$), indicating that the changes were statistically highly significant. The accuracy of performing 30 defensive high clear (Clear) strokes increased from $6.1 \pm 0.9\%$ to $13.8 \pm 1.6\%$. The absolute increase was 7.7 units, and the relative increase was 26.23%. The t-value of 4.53 ($P < 0.001$) confirms the high effectiveness of the training intervention. The accuracy of executing the Smash stroke increased from $7.0 \pm 1.0\%$ to $14.6 \pm 2.0\%$. The improvement amounted to 7.6 units with a relative increase of 46.24%. Statistical analysis showed a t-value of 4.6 ($P < 0.005$), indicating that the training was effective in developing offensive technical skills. In the Drop Shot test from the rear court to the net, accuracy improved from $5.8 \pm 0.6\%$ to $11.25 \pm 1.91\%$. The absolute increase was 5.45 units, and the relative increase was 37.95%. The t-value of 9.45 ($P < 0.001$) confirmed that the changes were highly reliable. The accuracy of the Backhand stroke improved from $5.4 \pm 0.9\%$ to $10.17 \pm 2.59\%$, with an absolute increase of 4.77 units and a relative increase of 33.6%. The t-value of 7.55 ($P < 0.001$) confirms the effectiveness of the training program. The greatest positive change was observed in the attacking Drive/Flick stroke. The accuracy increased from $6.3 \pm 0.9\%$ to $16.83 \pm 1.77\%$, representing an absolute increase of 10.53 units and a relative increase of 55.05%. The t-value of 5.88 ($P < 0.001$) indicates a very high level of effectiveness of this exercise. The accuracy of serving with the forehand (open racket face) increased from $7.0 \pm 0.9\%$ to $15.8 \pm 1.1\%$, with an improvement of 8.8 units and a relative increase of 29.04%. The t-value of 8.42 ($P < 0.001$) confirms the statistical reliability of the results. The accuracy of serving with the backhand (closed racket face)

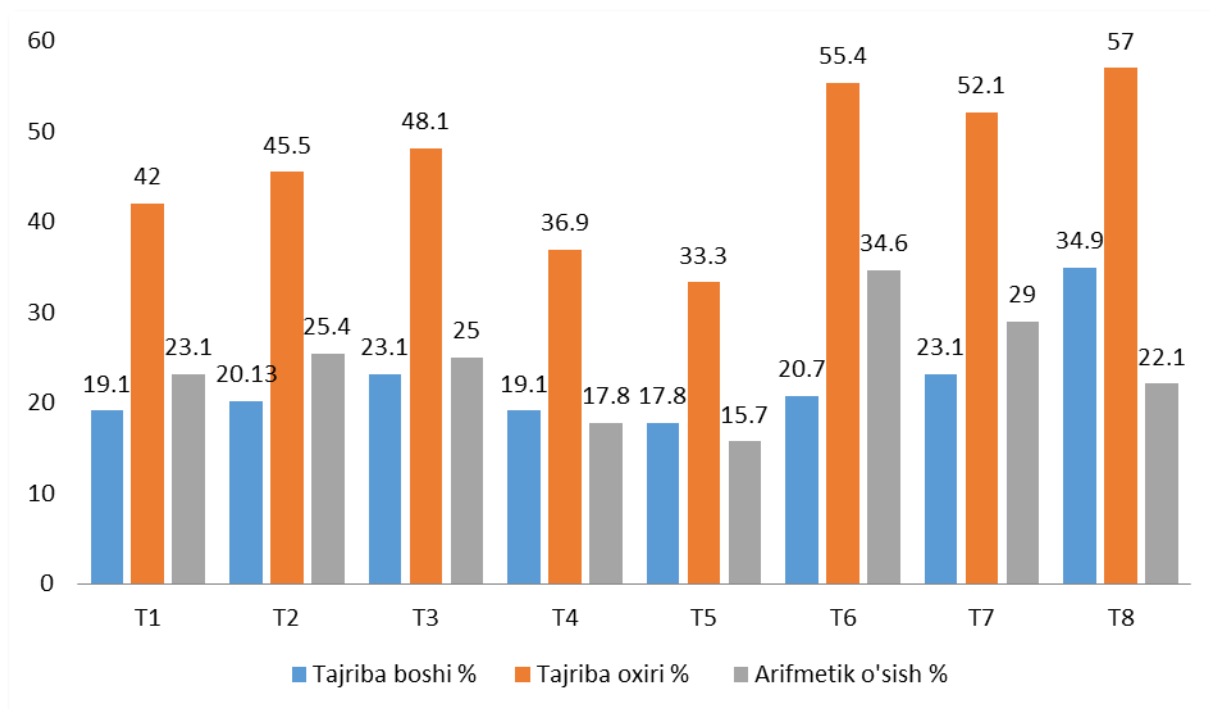
increased from $10.6 \pm 1.2\%$ to $17.3 \pm 1.8\%$, with an absolute increase of 6.7 units and a relative increase of 63.20%. The t-value of 12.49 ($P < 0.001$) demonstrated the highest level of statistical significance among all tested indicators. See Table 1.

Table 1. Comparative analysis of technical and tactical preparedness indicators recorded at the beginning and at the end of the pedagogical experiment in the experimental group ($n = 12$).

Test exercises	Pre-test			Post-test			AO'	NO'	t	P
	$\bar{x}$	σ	V, %	$\bar{x}$	σ	V, %				
Accuracy of executing 30 side-court flat strokes (Drive) (%)	5,8	0,9	15,52	12,75	1,82	14,24	6,95	42,5	5,86	<0,001
Accuracy of performing 30 defensive high Clear strokes (%)	6,1	0,9	14,75	13,8	1,6	11,59	7,7	26,23	4,53	<0,001
Accuracy of performing 30 Smash strokes (%)	7	1,0	14,29	14,6	2	13,70	7,6	46,24	4,6	<0,005
Accuracy of executing 30 Drop Shot strokes (rear court to net) (%)	5,8	0,6	10,34	11,25	1,91	16,98	5,45	37,95	9,45	<0,001
Accuracy of performing 30 Backhand strokes (closed racket face, left side) (%)	5,4	0,9	16,67	10,17	2,59	25,47	4,77	33,6	7,55	<0,001
Accuracy of performing 30 attacking Drive/Flick strokes (%)	6,3	0,9	14,29	16,83	1,77	10,52	10,53	55,05	5,88	<0,001
Accuracy of executing 30 forehand serves (open racket face) (%)	7	0,9	12,86	15,8	1,1	6,96	8,8	29,04	8,42	<0,001
Accuracy of executing 30 backhand serves (closed racket face) (%)	10,6	1,2	11,32	17,3	1,8	10,41	6,7	63,20	12,49	<0,001

In this study, the effectiveness of a training program aimed at improving the technical and tactical preparedness of young badminton players was evaluated based on the indicators obtained at the beginning and at the end of the pedagogical experiment. The results revealed that the training system implemented during the experiment led to positive and statistically significant improvements across all investigated technical exercises. The analysis of the results demonstrated that the level of improvement in stroke accuracy was not uniform across all exercises. The highest rates of improvement were observed in offensive strokes, particularly in the Drive/Flick and Smash exercises. This can be explained by the relatively high proportion of

training tasks focused on developing quick decision-making, movement speed, and stroke power control during the training process. These findings are consistent with previous scientific studies indicating that the development of offensive techniques significantly enhances overall game performance in badminton. Significant positive changes were also observed in defensive Clear strokes and in the technically complex Drop Shot exercises. In particular, the high t-value recorded in the Drop Shot test confirms the importance of repetitive and targeted practice in developing this technical element. These results indicate an improved ability among young athletes to perceive the court space and accurately direct shuttlecock placement. Furthermore, the improvements observed in both forehand and backhand service execution demonstrate a stable formation of shuttlecock serving techniques. The particularly high relative improvement in backhand serves suggests that this technical element was initially more challenging for the athletes, but was effectively mastered through systematic training. The reduction in variation coefficients in most exercises indicates that the athletes' performance became more consistent and stable. This reflects a decrease in individual technical errors and a higher level of automatization of technical movements. At the same time, a slight increase in variation in some exercises suggests differences in the rate of technical development among athletes, highlighting the need for individualized training approaches. Overall, the results of the pedagogical experiment confirmed that the specialized training tools used in this study had a significant positive impact on the technical and tactical preparedness of young badminton players. As shown in the diagram, a steady and consistent improvement trend was observed between pre-test and post-test results across nearly all evaluated technical exercises.



1- Figure. Percentage dynamics of performance indicators recorded at pre-test and post-test in the experimental group participants.

At the beginning of the experiment, the athletes' performance indicators were relatively low and were mainly characterized by insufficient accuracy and stability in executing technical movements. By the end of the experiment, a significant improvement in these indicators was observed, indicating the effectiveness of the training program, particularly the exercises aimed at developing coordination, speed, and accuracy. Notably, a higher rate of improvement in exercises with more complex movement structures confirms an increased level of motor skill automatization among the athletes. This demonstrates that systematic training contributed to the refinement and stabilization of technical execution in young badminton players.

Conclusion. In the process of training young badminton players, the conducted research on teaching technical and tactical actions yielded the following conclusions:

The use of seven control tests for assessing the level of teaching technical-tactical actions and eight control tests for determining the level of technical-tactical preparedness provided reliable and rapid information about the preparedness of young badminton players at the initial training stage, ensuring objective assessment indicators.

The application of optimal ratios of specialized preparatory exercises aimed at developing technical-tactical abilities of young badminton players had a positive effect on the improvement of sport performance. At the end of the pedagogical experiment, the experimental group demonstrated statistically significant improvements across all test exercises, confirming

reliable progress in all technical stroke types. The accuracy of side-court flat (Drive) strokes increased to $12.75 \pm 1.82\%$ ($t = 11.8$, $P < 0.001$), with an absolute improvement of 6.95 units and a relative increase of 23.1%. The accuracy of defensive high Clear strokes reached $13.8 \pm 1.6\%$ ($t = 14.53$, $P < 0.001$), with an improvement of 7.7 units and 26.23% relative growth. Smash stroke performance improved to $14.6 \pm 2.0\%$ ($t = 11.78$, $P < 0.001$), with an absolute increase of 7.6 units and 25.1% growth. Drop Shot accuracy also showed significant improvement ($t = 9.43$, $P < 0.01$), with an absolute increase of 5.45 units and a relative growth of 17.8%, confirming reliable effectiveness of targeted technical training.

At the initial training stage, the development of optimal training load ratios aimed at improving attacking, defensive, and counter-attacking skills in young badminton players led to significant improvements in movement speed, agility, and strength-related abilities. In the shuttle-run test (running from the center to four corners, 8 repetitions), the average time improved from 86.17 s to 65.25 s (absolute improvement: 20.92 s; relative improvement: 24.27%; $t = 20.05$, $P < 0.05$), indicating enhanced speed and endurance, as well as improved tactical repositioning ability by 24.27%. In the 5×6 m shuttle run test, performance improved from 10.39 s to 8.88 s (absolute improvement: 1.51 s; relative improvement: 14.54%; $t = 2.66$, $P < 0.05$), confirming a statistically significant increase in agility and improved transition from defense to counter-attack by 14.5%. In the push-up test (15 repetitions from a prone position), the average time improved from 17.73 s to 15.29 s (absolute improvement: 2.44 s; relative improvement: 13.76%; $t = 2.28$, $P < 0.05$), indicating improved arm muscle strength and speed, with a 13.7% increase in strength indicators among young athletes. Overall, the results confirm that the implemented training methodology significantly enhanced both technical-tactical skills and physical performance components in young badminton players at the initial training stage.

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