DOI: https://doi.org/10.37547/mesmj-V7-I3-35 Pages: 286-294

MENTAL ENLIGHTENMENT SCIENTIFIC – METHODOLOGICAL JOURNAL

MENTAL ENLIGHTENMENT SCIENTIFIC – METHODOLOGICAL JOURNAL

http://mentaljournal-jspu.uz/index.php/mesmj/index

THE EFFECT OF RAPID-STRENGTH QUALITIES OF WATER POLO PLAYERS ON THE EFFECTIVENESS OF COMBINATION ATTACKS

Shoxboz Murotjonovich Usmonjonov
Independent Researcher, Institute of Physical Education and Sports Science
Swimming Coach, Befit-Pro Wellness Complex
Master of Sports in Water Polo
E-mail: shoxbozusmonjonov0910@gmail.com
Tashkent, Uzbekistan

ABOUT ARTICLE

Key words: Water polo, rapid-strength qualities, combination attack, explosive strength, specialized training, technical-tactical preparation, effectiveness of combination attacks.

Received: 01.04.26
Accepted: 02.04.26
Published: 03.04.26

Abstract: The article examines the impact of developing rapid-strength qualities in water polo players on the effectiveness of combination attacks. The study involved 24 athletes, who were divided into control and experimental groups. For the experimental group, a weekly training program was developed, aimed at enhancing explosive strength, speed, strength endurance, and specific technical-tactical actions both on land and in water. The program included jumping exercises, drills with a weighted ball, strength exercises with a barbell, swimming with resistance and weights, acceleration drills, and control games. The results of the study confirm that specialized rapid-strength training is a significant factor in improving the effectiveness of combination attacks in water polo players.

Introduction. In modern water polo, combination attacks are considered the main means of achieving results during the offensive phase of the game. The effectiveness of offensive actions depends on the players' level of physical preparedness, particularly on the highly developed rapid-strength qualities. These qualities determine an athlete's ability to generate force quickly under conditions of high physical activity, which is especially noticeable

in shooting the ball, making sudden openings, rapidly changing direction, playing under tight defensive pressure, and transitioning quickly from defense to attack [2].

Currently, the modern state of water polo and its future development trends are characterized by the increasing influence of the general physical fitness of players and teams, particularly their strength and rapid-strength preparedness. These qualities manifest in most game actions performed by water polo players and largely determine their effectiveness [1].

Analysis of the training and competitive activities of skilled water polo players and teams, as well as a review of scientific literature, allows us to confidently discuss the specific characteristics of the manifestation of rapid-strength qualities in water polo players. Thus, depending on the type of game action or its structural features and classification, water polo players primarily demonstrate either maximal or explosive strength, or rapid-strength qualities, which, along with other factors, affect the quality of these actions.

Purpose of the Study

To determine the impact of the development of rapid-strength qualities on the effectiveness and efficiency of water polo players' combination attacks in competitions.

Objectives of the study:

1. To analyze theoretical approaches to the development of rapid-strength qualities;

2. To investigate the effect of water polo players' rapid-strength qualities on the effectiveness of combination attacks;

3. To justify the impact of exercises aimed at developing rapid-strength qualities on the specialized training of water polo players.

Methods. Analysis of scientific and methodological literature, classification, comparative analysis, pedagogical observation, pedagogical experimentation, and mathematical-statistical methods.

The study was conducted over six months at the Namangan Sports School specializing in aquatic sports. For water polo players in the first year of skill improvement, the set of specialized exercises recommended by us was applied during the training process. Participants were divided into 12 athletes in control and experimental groups. The experimental group applied the recommended exercise set in the training process, while the control group followed a traditional training program.

At the beginning and end of the study, in order to comparatively analyze the effectiveness of the recommended exercise set, the following tests were used: standing long jump, 10 repeated jumps from a deep squat position, throwing a 1 kg weighted ball overhead with both hands from a seated position, swimming 25 meters with the ball using the water polo

crawl, shooting at a designated sector of the goal from a 7-meter distance, and evaluating combination attacks and goals scored during a 10-minute control game. The results obtained were subjected to mathematical statistical analysis.

A combination attack is an interrelated and coordinated offensive action that includes passing the ball, changing positions, making sudden openings, and precise ball delivery. Players are required to demonstrate high movement speed, passing accuracy, powerful shots, and the ability to maintain physical stability during cooperative play. Combination attacks are developed under conditions of high-intensity actions, and each movement requires a high level of rapid-strength preparedness.

The effect of the development of rapid-strength qualities on the effectiveness of attacks in water polo players emerges conditionally in three cases (Figure 1).

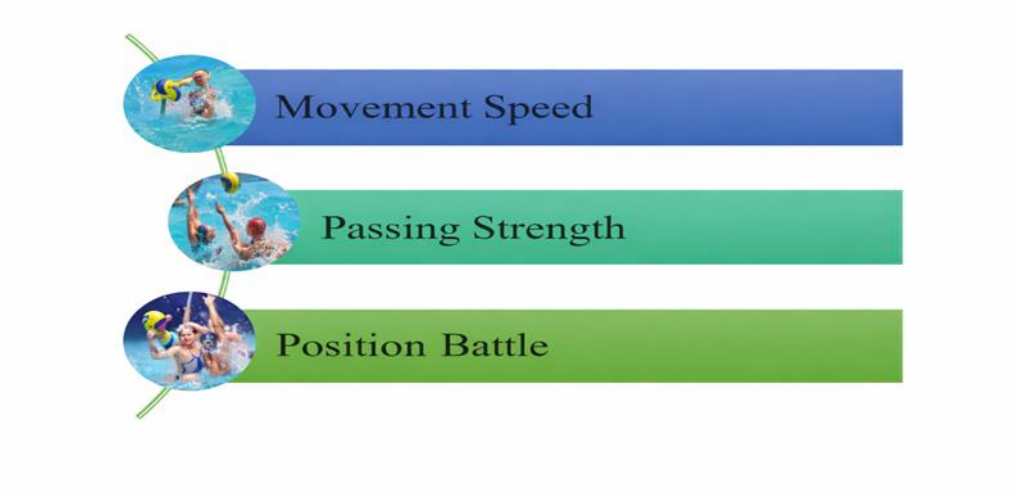

Figure 1. Components of a Combination Attack.

Movement speed – Rapid changes in positions, swimming into open spaces, or returning to defense require high speed. Water polo players with well-developed rapid-strength skills cover distances more quickly, move effectively to create space, and apply strong pressure on the opponent's defense.

Shot power – The quality of a shot directly depends on the strength of the core body, shoulder, and leg muscles. Powerful shots exert pressure on the goalkeeper's performance and increase the likelihood of scoring a goal [3].

Positional defense – Rapid-strength skills enable players to win battles for the ball under defenders' pressure and maintain their positions on the wing or near the goal.

Many studies have shown that teams with well-developed rapid-strength qualities lose the ball less during positional attacks, achieve more success in one-on-one ball battles, and

demonstrate high efficiency in passing. In water polo, the development of rapid-strength qualities is directly related to increased offensive effectiveness [4].

Results. In our study, we used specialized exercises aimed at enhancing water polo players' specific training and further developing rapid-strength qualities, thereby improving the effectiveness of combination attacks. The following specialized exercises were applied in the training process for the participants (Table 1).

Table 1

A Set of Specialized Exercises Aimed at Developing Speed–Strength Qualities in Skilled Water Polo Players

Day	Location	Focus	Training Content	Volume	Intensity (Zone)
Monday	Dryland	Development of explosive strength (lower limbs)	Jumping drills, squat jumps, medicine ball exercises	3–4 sets	IV
	Aquatic		Explosive start drills, resisted exercises, weighted exercises	4–5 sets	III–IV
Tuesday	Dryland	Speed-oriented training in aquatic performance	Lateral jumps over a gymnastics bench, rope skipping	10–15 min	IV
	Aquatic		Acceleration drills over 15–25 m, explosive start drills	15–20 min	IV
Wednesday	Dryland	Strength development exercises	Barbell exercises (bench pull, lifts), Swedish wall exercises	10–15 min	III
	Aquatic		Resisted exercises, weighted drills (upper and lower limbs)	40–60 min	III
Thursday	Dryland	Specialized speed–strength exercises	Medicine ball drills (two-handed overhead, single-hand side throws), barbell exercises	15–20 min	IV
	Aquatic		Elastic-resistance swimming, interval swimming (4×100 m R15; 4×200 m R25)	30–40 min	III–IV
Friday	Aquatic	Control game	Improving effectiveness of combination plays and counterattacks	40 min	V
Saturday	Aquatic	Strength endurance development	Circuit training	3 circuits	III
Sunday	Dryland	Recovery-oriented exercises	Stretching exercises on Swedish wall, partner-assisted and equipment-based stretching	10–15 min	II
	Aquatic		Light swimming drills, ball-passing drills with partner at various distances	20–30 min	II

Within the framework of the study, training sessions aimed at developing athletes' speed–strength qualities were planned based on a weekly microcycle. Training loads were organized through a balanced combination of dryland and aquatic sessions, ensuring the comprehensive development of physical qualities.

On Monday, training sessions were devoted to the development of explosive strength. During dryland training, jumping exercises, squat jumps, and medicine ball exercises were used to increase the explosive power of the lower limb muscles. These loads were performed in 3–4 sets at high intensity (Zone IV). Aquatic training focused on explosive starts, resisted movements, and exercises performed with additional weights to enhance sport-specific speed–strength preparedness (Zones III–IV).

On Tuesday, speed development was established as the primary focus. Dryland sessions included lateral jumps over a gymnastics bench and rope-skipping exercises, which improved movement speed and coordination abilities. In the aquatic environment, acceleration drills over distances of 15–25 meters and start technique exercises were used to enhance swimmers' sport-specific speed. Exercises were predominantly performed at high intensity (Zone IV).

On Wednesday, training sessions were directed toward strength development. Dryland training included barbell exercises and Swedish wall exercises aimed at strengthening major muscle groups. In aquatic sessions, resistance- and weight-based exercises were used to develop sport-specific strength. The loads were performed at moderate intensity (Zone III).

On Thursday, specialized exercises targeting speed–strength qualities were implemented. On land, various directional medicine ball throws and barbell exercises were used to simultaneously develop explosive power and movement speed. In the aquatic environment, swimming with elastic resistance devices and interval swimming sets (4×100 m, 4×200 m) were applied to improve speed–strength endurance (Zones III–IV).

On Friday, training sessions were conducted in the form of a control game. These sessions were aimed at improving the effectiveness of combination plays and counterattacks and were performed under maximal intensity conditions (Zone V). Control games provided an opportunity to assess athletes' physical and technical–tactical preparedness in a realistic competitive environment.

On Saturday, circuit training was employed to develop strength endurance. Exercises were performed sequentially and repeatedly, contributing to improved muscular functional endurance (Zone III).

On Sunday, particular attention was given to recovery processes. Dryland sessions included stretching and muscle relaxation exercises, while aquatic training consisted of light

swimming and paired technical drills. These sessions were conducted at low intensity (Zone II) and served to restore the athletes' functional condition.

It should be emphasized that the weekly microcycle loads were based on the principles of targeted development of physical qualities, ensuring an optimal balance between load and recovery processes, and improving athletes' sport-specific game preparedness to enhance the effectiveness of combination attacks.

To evaluate the effectiveness of the proposed methodology, mathematical and statistical analyses were conducted on participants' performance indicators before and after the experiment using the following tests: standing long jump; 10 consecutive jumps from a deep squat position; two-handed overhead throw of a 1 kg medicine ball from a seated position; 25 m front crawl swimming with a ball using the water polo technique; and shooting accuracy test by throwing the ball from 7 m into a designated sector of the goal. The analysis of these indicators is presented in the table below (Table 2).

Table 2

Comparative Analysis of Performance Indicators of First-Year Athletes in the Sports Excellence Group (Water Polo Players)

		At the Beginning of the Study			At the Beginning of the Study			Improvement %	t	P
		$\overline{X}$	σ	V, %	$\overline{X}$	σ	V, %			
Standing Long Jump (cm)	NG (n=12)	126,63	4,26	8,17	131,75	3,90	7,34	3,9	1,33	p>0,05
	TG (n=12)	126,38	4,28	9,62	144,50	4,24	7,81	12,6	3,01	p<0,05
Ten Consecutive Jumps from a Deep Squat Position (seconds)	NG (n=12)	13,59	0,84	6,19	12,23	0,64	5,27	10,3	0,89	p>0,05
	TG (n=12)	13,68	0,75	5,52	10,13	0,46	7,23	22,3	4,09	p<0,001
Seated Two-Handed Overhead Throw of a 1 kg	NG (n=12)	6,79	0,40	5,84	7,81	0,38	4,81	12,9	1,81	p>0,05
	TG (n=12)	6,68	0,52	7,76	9,28	0,37	4,04	27,9	4,07	p<0,001

Medicine Ball (m)										
25 m Water Polo Front Crawl While Dribbling the Ball (seconds)	NG (n=12)	14,28	0,43	3,00	13,08	0,49	3,74	9,4	1,84	p>0,05
	TG (n=12)	14,23	0,46	3,26	11,88	0,46	3,90	16,8	3,69	p<0,05
Shooting Accuracy from 7 m into a Designated Sector of the Goal (out of 10 attempts)	NG (n=12)	6,92	0,79	11,46	8,08	0,51	6,37	14,4	1,23	p>0,05
	TG (n=12)	6,92	0,67	9,54	9,67	0,49	5,09	28,5	3,31	p<0,05

The study results demonstrated significant differences between the experimental group (EG) and the control group (CG). In the standing long jump test, improvement in the CG amounted to 3.9%, which was not statistically significant ($t = 1.33$; $p > 0.05$). Meanwhile, the EG showed a 12.6% improvement, indicating a statistically significant enhancement ($t = 3.01$; $p < 0.05$).

Discussion. In the 10 consecutive jumps from a deep squat position, results in the CG improved by 10.3%, but the difference was not statistically significant ($t = 0.89$; $p > 0.05$). In contrast, the EG demonstrated a 22.3% increase, representing a highly significant improvement ($t = 4.09$; $p < 0.001$).

In the seated two-handed overhead throw of a 1 kg medicine ball, the CG showed an improvement of 12.9%, which was not statistically significant ($t = 1.81$; $p > 0.05$). The EG, however, demonstrated a 27.9% increase, with a statistically significant difference recorded ($t = 4.07$; $p < 0.001$).

In the 25 m water polo front crawl while dribbling the ball, the CG improved performance by 9.4%, though the statistical significance was low ($t = 1.84$; $p > 0.05$). The EG exhibited a 16.8% improvement, forming a statistically significant difference ($t = 3.69$; $p < 0.05$).

In the shooting accuracy test (10 attempts from 7 m into a designated sector of the goal), the CG recorded a 14.4% improvement, which was not statistically significant ($t = 1.23$; $p >$

0.05). Conversely, the EG demonstrated a 28.5% increase, with statistically significant differences observed ($t = 3.31$; $p < 0.05$).

Conclusion. The findings indicate that the targeted development of speed–strength qualities in water polo players significantly improves the effectiveness of combination attacks. The weekly training program developed during the experimental process comprehensively integrated explosive strength, speed, strength endurance, and sport-specific technical–tactical training elements under both dryland and aquatic conditions.

Dryland jump exercises, medicine ball drills, and barbell strength training contributed to the development of explosive and maximal strength indicators in athletes. Aquatic acceleration drills, resisted and weighted swimming, elastic-resistance exercises, and explosive start movements enhanced speed and sport-specific strength. Special emphasis on combination play and counterattack elements during control games ensured the direct integration of developed physical qualities into competitive performance.

Statistical analyses revealed significant positive changes across all test indicators in the experimental group ($p < 0.05$ – $p < 0.001$). Particularly notable improvements were observed in deep squat jumps, medicine ball throws, and shooting accuracy from 7 meters. These findings confirm that improvements in speed–strength qualities lead to increased shooting power, greater jump height, enhanced aquatic acceleration, and better movement coordination. As a result, athletes demonstrated faster organization of combination attacks, more effective positional transitions, and improved finishing efficiency.

The study scientifically substantiates that the systematic and targeted development of speed–strength qualities is a critical factor in enhancing the effectiveness of combination attacks in water polo players. The developed training program is recommended for practical implementation and may contribute to achieving high performance in competitive activities.

References:

1. Zoitova G.M. Development of Strength Qualities in Swimmers Aged 15–17. SCIENTIFIC PROGRESS Scientific Journal, ISSN: 2181-1601, Vol. 1, Issue 4, pp. 25–33.

2. Sadykov A.G., Matnazarov Kh.Yu., Rakhimbaev U.Kh. Introduction to Specialization in a Selected Sport (Water Polo). Tashkent: O‘ZKITOBSAVDONASHRIYOTI MIU, 2025. 226 p.

3. Frolov S.N., Chistova N.A. Water Polo. Sports Training. Initial Stage: Textbook. Moscow: Blok-Print, 2023. 176 p.

4. Frolov S.N., Chistova N.A., Borisova M.O. Analysis of Competitive Performance of the World's Strongest Women's Water Polo Teams. Molodoy Ucheny, 2020, No. 20 (310), pp. 490–495.