Effectiveness of developing endurance capacity through the complex application of special exercises in kurash training

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Abstract

The article substantiates the scientific and methodological foundations for developing endurance capacity in Kurash athletes through the complex application of special exercises. In this paper, endurance capacity is interpreted not only as the ability to perform prolonged physical work, but also as the ability to repeatedly execute technically accurate throwing, gripping, movement and defensive actions under conditions of accumulating fatigue. The relevance of the study is determined by the growing intensity of modern combat-sport contests and by the need to improve the transfer of training effects from conditioning sessions to competitive performance. The research logic included the analysis of scientific and methodological literature, pedagogical observation, modelling of an eight-week training mesocycle, selection of sport-specific control tests, and development of a practical monitoring system based on heart rate, rate of perceived exertion and technical-quality indicators. The proposed methodology combines repeated dummy throws, grip-and-pull intervals, stance-motion circuits, sprawl-to-throw combinations, resistance-band attacks, short situational bouts and recovery-regulated interval work. The article argues that endurance development in Kurash should be organized as a unified pedagogical system in which general physical preparation, special physical preparation and technical-tactical training are not separated mechanically, but are connected by a common competitive logic. Coaches and researchers can use the proposed model as a structured basis for planning, monitoring and experimentally verifying endurance-oriented special training in Kurash.

***Keywords**:* Kurash, wrestling, endurance capacity, special exercises, special physical training, interval training, technical-tactical preparation, pedagogical experiment.

Introduction

Kurash is a national combat sport with a complex motor structure. Its competitive activity requires explosive throwing actions, stable body control, rapid changes of grip and distance, efficient movement in standing position, and the ability to maintain technical accuracy despite increasing fatigue. For this reason, the development of endurance in Kurash cannot be reduced to general running capacity or to the isolated improvement of cardiovascular fitness. It must be understood as a specific ability to sustain repeated, high-intensity and technically meaningful actions during training and competition.

The modern training process in combat sports is characterized by a growing demand for evidence-based planning. Coaches are expected to regulate training loads, monitor adaptation, prevent excessive fatigue, and ensure that physical preparation directly supports technical and tactical performance. In Kurash, this issue is especially important because competitive success depends on the quality of throws and gripping actions performed in short, intense exchanges. When an athlete becomes fatigued, the effectiveness of the attack often decreases, the ability to control the opponent's balance is reduced, and the probability of technical errors increases.

Traditional endurance training in many sport schools still relies heavily on continuous running, general calisthenics or nonspecific circuit work. Such means are useful for building a general physical foundation, but they do not always provide sufficient transfer to the specific demands of Kurash. A wrestler may demonstrate acceptable general endurance while failing to preserve throwing frequency, grip strength, stance stability and tactical decision-making during the final part of a bout. This contradiction indicates that endurance development must be organized through special exercises that reproduce the energetic, coordinative and technical features of the sport.

The dissertation topic, 'Effectiveness of developing endurance ability through the integrated use of special exercises in Kurash training', reflects an important scientific and practical problem. The central idea is that endurance is most effectively improved when special exercises are applied in a complex manner: not as random drills, but as a planned system connecting work-rest ratios, exercise sequence, technical complexity, physiological intensity and recovery control. Therefore, the present article aims to substantiate a scientifically grounded methodology for developing endurance capacity in Kurash athletes through the complex use of special exercises.

The objective of this article is to scientifi-

cally substantiate and describe a methodology for developing endurance capacity in Kurash athletes through the complex application of special exercises that integrate physical, technical and tactical components of training.

Research Tasks.

1. To analyse the pedagogical and physiological essence of endurance capacity in Kurash training.
2. To identify the main groups of special exercises that can be used for developing sport-specific endurance.
3. To develop a structured training model based on complex application of special exercises within an eight-week mesocycle.
4. To propose a practical system of control tests and monitoring indicators for evaluating endurance development in Kurash athletes.
5. To formulate methodological recommendations for coaches and researchers implementing endurance-oriented special training.

Materials and Methods. The article is based on a scientific-methodological research design. The methodological foundation included analysis of international literature on combat-sport physiology, endurance training, high-intensity interval training, resistance training progression and pedagogical control; generalization of coaching practice in grappling sports; and modelling of a special training programme for Kurash athletes. The structure of the article follows the logic of an original scientific-methodological manuscript and can be adapted into a full experimental paper after the insertion of the author's primary empirical data.

The proposed practical model is intended for qualified youth or adult Kurash athletes with regular training experience. For empirical verification, the recommended sample is 30-40 athletes divided into control and experimental groups with comparable age, body mass, sport qualification and baseline fitness level. The control group may continue traditional training with general conditioning, whereas the experimental group should receive the special endurance complex integrated into regular Kurash practice.

The proposed intervention period is eight weeks. This duration is sufficient for observing initial changes in special endurance, while remaining realistic for a pre-competition or general-preparatory mesocycle. Training sessions are planned three times per week, with the special endurance block lasting 20-30 minutes after warm-up and before the main technical-tactical or sparring part of the session. Intensity should be regulated through heart rate, rate of perceived exertion and technical-quality observation.

The complex of special exercises includes repeated dummy throws, partner-resisted gripping, resistance-band pulling into attack entries, stance-motion and footwork circuits, sprawl-to-throw combinations, short situational bouts, and interval tasks requiring the athlete to perform technically valid actions under incomplete recovery. The main methodological condition is that the athlete must preserve technique while working at high intensity. If the number of repetitions increases but technical quality collapses, the load cannot be considered pedagogically effective.

The following monitoring indicators are recommended: resting heart rate, peak heart rate during special exercises, one-minute heart-rate recovery, session rate of perceived exertion, total number of technically valid throws, fatigue index in repeated throwing tasks, grip-endurance time, and coach-rated technical quality under fatigue. Mathematical-statistical analysis may include mean values, standard deviation, percentage change, Student's t-test, repeated-measures analysis of variance or a linear mixed-effects model, depending on the structure of the dataset.

Results and discussion

The main result of the methodological analysis is the development of a structured model in which endurance capacity is formed through the interaction of three training components: general functional preparedness, special physical preparedness and technical-tactical execution under fatigue. The model differs from traditional conditioning because the main training effect is obtained not from the duration of work alone, but from the repeated performance of Kurash-specific actions with controlled intensity and incomplete recovery.

The proposed methodology allows coaches to solve several tasks simultaneously. First, it improves the athlete's ability to perform repeated throws and grip actions. Second, it strengthens the connection between endurance and technical quality. Third, it creates a practical monitoring system through which the coach can regulate intensity, density and recovery. Fourth, it reduces the risk that endurance training becomes detached from the real movement structure of Kurash.

Table 1.Structure of the proposed eight-week special endurance programme

Stage	Weeks	Main pedagogical aim	Core means	Load-control emphasis
Adaptation	1-2	Prepare athletes for special interval work and standardize technique.	Low-to-moderate density dummy throws, basic gripping intervals, stance-motion drills, mobility and trunk stability.	RPE 5-7; focus on correct movement and safe execution.
Development	3-5	Increase repeated-effort capacity in sport-specific actions.	Repeated throws, grip-and-pull attacks, sprawl-to-throw combinations, 20-30 s work intervals with incomplete recovery.	RPE 7-8; HR and technical-quality monitoring.
Integration	6-8	Transfer endurance gains to technical-tactical situations.	High-density special circuits, short situational bouts, attack-defence sequences and fatigue-based technical tasks.	RPE 8-9; maintain valid technique under fatigue.

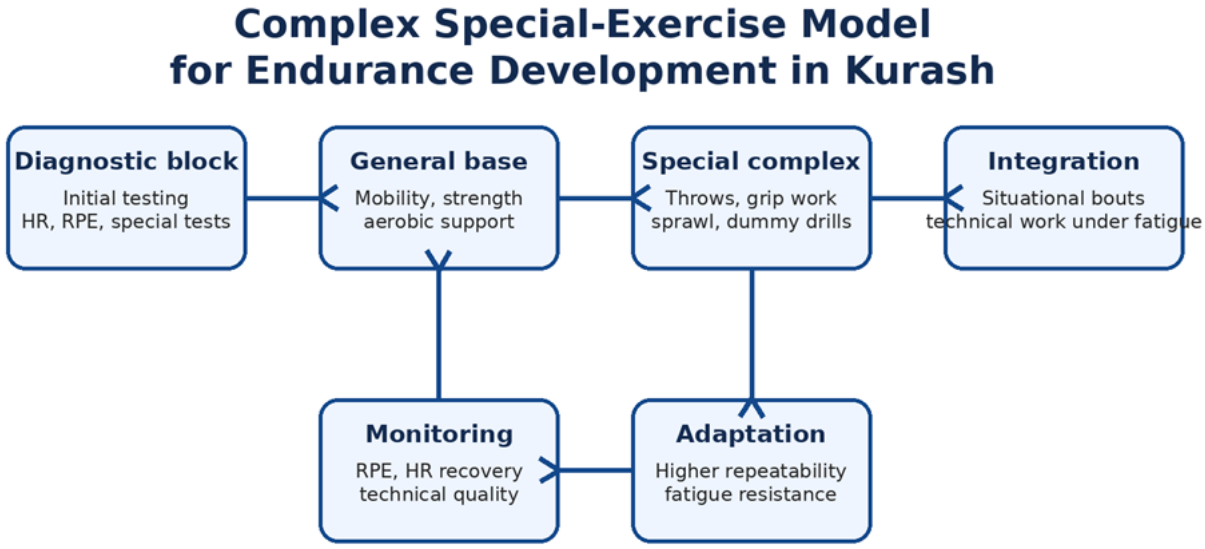
A key practical result is the proposed system of control tests. These tests are designed to evaluate not only general fitness but also the athlete's capacity to preserve sport-specific motor actions during fatigue. The battery includes a repeated throw test, grip endurance test, special interval circuit, heart-rate recovery and technical-quality assessment. Such a battery is more informative for Kurash than general running tests alone because it reflects the competitive functions that determine performance in a bout.

The expected pedagogical effect of the programme is expressed in improved repeata-

Table 2. Recommended groups of special exercises for developing endurance capacity in Kurash

Exercise group	Examples	Main physical effect	Technical-tactical value
Throwing endurance exercises	Repeated dummy throws; partner-assisted throws; 15–20 s maximal throw series.	Special strength endurance of legs, trunk and shoulder girdle.	Improves ability to execute throws repeatedly without losing movement structure.
Grip and pulling exercises	Belt or jacket gripping; resistance-band pulls; partner hand-fighting intervals.	Local muscular endurance of forearms, shoulders and back.	Supports grip control and attack preparation under fatigue.
Movement and stance circuits	Circular footwork; stance changes; forward-backward movement; direction changes.	Coordination endurance and postural stability.	Helps maintain balance, distance and readiness for attack.
Combined technical intervals	Grip entry + off-balancing + throw; sprawl + recovery + counterattack.	Anaerobic repeatability and fast recovery between efforts.	Connects physical load with competitive decision-making.
Situational bouts	30–45 s tasks from predefined grips or positions.	Integrated special endurance under opponent resistance.	Develops technical effectiveness in conditions close to competition.

Fig 1. Complex special-exercise model for endurance development in Kurash training.



Training effect: endurance capacity improves when physiological loading, technical specificity and feedback are organized as one pedagogical system.

bility of technical actions, reduced fatigue index in throwing tasks, faster heart-rate recovery, more stable gripping performance and better preservation of technical quality in the final part of training tasks. In a full experimental version of the article, these indicators should be presented as pre-test and post-test values for the control and experimental groups, with statistical significance and effect sizes.

Table 3. Proposed control tests for evaluating endurance development in Kurash athletes

Indicator	Test procedure	Measured variable	Interpretation
Repeated throw test	Two 3–min periods; 15 s maximal technically valid throws / 15 s movement; 30 s rest between periods.	Total throws; throws in period 1 and period 2; fatigue index.	Shows the ability to maintain throwing activity across bout–like duration.
Grip endurance test	Athlete holds a standardized grip on belt/jacket or dynamometer–based task until technical failure.	Holding time or repeated pull count.	Reflects local endurance important for grip control.
Special interval circuit	4–6 stations: grip pull, dummy throw, stance movement, sprawl, attack entry.	Completed repetitions, HR, RPE and technical errors.	Evaluates integrated endurance under complex movement conditions.
Heart–rate recovery	Measure HR immediately after task and after 1 min recovery.	Decrease in beats per minute.	Higher recovery indicates better functional adaptation.
Technical quality under fatigue	Two experts rate final–minute technique using a 5–point scale.	Mean expert score and agreement.	Shows whether endurance supports skill execution rather than only physical output.

Note: the empty cells in Table 3 are intended for the author's actual dissertation data. They should not be filled with invented values. For journal submission as an empirical article, exact numerical results must be inserted and verified.

The proposed methodology is consistent with the principle of training specificity. In Kurash, endurance becomes practically meaningful only when it allows the athlete to continue performing technically accurate and tactically purposeful actions. Therefore, the most effective training means are those that reproduce the rhythm, posture, muscular involvement and decision-making conditions of competitive activity. General endurance is necessary, but it is not sufficient for high-quality performance in grappling sports.

The complex application of special exercises provides a more direct transfer to competition because it develops endurance together with the motor skills that must be preserved under fatigue. Repeated dummy throws improve the athlete's ability to coordinate leg drive, trunk rotation and upper-body control during high-density work. Grip-and-pull intervals strengthen the local endurance of the muscles that maintain contact with the opponent. Stance-

motion circuits preserve balance and movement economy. Situational bouts introduce resistance, unpredictability and tactical choice. Together, these components form an integrated pedagogical mechanism.

An important feature of the methodology is the regulation of exercise density. Endurance in Kurash is not formed simply by increasing the number of repetitions. It is formed by arranging repetitions, recovery pauses and technical complexity in a way that gradually increases the athlete's tolerance to fatigue without destroying movement quality. This is why the programme uses staged progression: adaptation, development and integration. Such progression allows the coach to avoid excessive early fatigue and to bring the athlete toward more competition-like conditions step by step.

The model also has diagnostic value. If an athlete improves running endurance but shows little progress in repeated throws or grip endurance, the coach can conclude that the training effect has not transferred sufficiently to Kurash activity. Conversely, if the athlete demonstrates a lower fatigue index and better technical quality during special tests, this indicates that endurance has been developed in a sport-specific form. Thus, the proposed methodology encourages coaches to evaluate not only how much work the athlete can perform, but also how effectively that work remains connected with technique.

The limitation of the present article is that it provides a scientific-methodological substantiation and a structured model rather than final empirical proof based on the author's complete statistical dataset. For a full experimental article, the proposed methodology should be tested in control and experimental groups, and the results should be presented with exact means, standard deviations, percentage changes, statistical significance and effect sizes. Nevertheless, the model has practical value because it gives a complete structure for planning and verifying endurance development in Kurash training.

Conclusion

1. Endurance capacity in Kurash should be understood as a specific ability to repeatedly perform technically accurate throwing, gripping, movement and defensive actions under conditions of accumulating fatigue.

2. Traditional general endurance training should be supplemented by special exercises that reproduce the movement structure, work-rest rhythm and technical demands of Kurash competition.

3. The complex application of repeated throws, grip-and-pull intervals, stance-motion circuits, sprawl-to-throw combinations and situational bouts creates a more competition-relevant method for developing endurance capacity.

4. The proposed eight-week model is based on three stages: adaptation, development and integration. This staged approach supports gradual load progression and helps preserve technical quality during fatigue.

5. The effectiveness of the methodology should be assessed through sport-specific tests, including repeated throw performance, fatigue index, grip endurance, heart-rate recovery and technical-quality evaluation.

Practical Recommendations

Coaches should include special endurance complexes two or three times per week, preferably after warm-up and before the main technical -tactical block. The duration of the special block should generally be 20-30 minutes, depending on the athlete's age, qualification and current stage of preparation.

The intensity of special exercises should be increased gradually. In the first stage, the athlete must master the movement structure and learn to maintain correct technique. In the second stage, exercise density and incomplete recovery should be increased. In the third stage, the exercises should be integrated into short situational bouts and competition-like tasks.

Monitoring should combine objective and subjective indicators: heart rate, one-minute heart-rate recovery, RPE, number of technically valid actions, fatigue index and expert assessment of technique. A training session should not be considered successful if the athlete completes many repetitions but performs them with poor technical quality.

Control testing should be conducted every six to eight weeks. The same tests, warm-up, time of day and recovery conditions should be used before and after the training cycle. This will make the interpretation of results more reliable and useful for both scientific analysis and coaching practice.

Declarations. Ethics approval. If this manuscript is submitted as an empirical study, the author must insert the name of the institutional ethics committee, protocol number and approval date. If the article is submitted as a scientific-methodological paper without human

testing, this should be stated clearly according to the journal requirements.

Informed consent. For empirical studies, written informed consent must be obtained from all participants. If participants are minors, parental consent and athlete assent are required.

Conflict of interest. The author declares no conflict of interest.

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Data availability. For the methodological version of this article, no public dataset is attached. For the empirical version, the data supporting the findings should be made available from the corresponding author upon reasonable request.

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