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DEVELOPING PHYSICAL QUALITIES IN FENCERS

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Abstract. The development of physical qualities is an essential component of successful fencing performance. Fencing is characterized by repeated high-intensity actions, rapid changes in direction, explosive attacks and defensive movements, precise coordination, and short recovery periods. Therefore, fencers require a combination of speed, agility, explosive strength, muscular endurance, flexibility, balance, coordination, and reaction ability. This article examines the main approaches to developing the physical qualities necessary for effective fencing performance. The study analyzes scientific and methodological literature concerning physical preparation in fencing and identifies the role of strength training, plyometric exercises, speed and agility drills, cardiovascular conditioning, flexibility training, and sport-specific exercises. The discussion emphasizes the importance of individualized and periodized training programs that correspond to the athlete's age, competitive level, weapon specialization, and stage of preparation.

Keywords: fencing, fencers, physical qualities, physical conditioning, speed, agility, explosive strength, endurance, coordination, reaction time, flexibility, balance, athletic performance.

Introduction. Fencing is a technically and physically demanding combat sport that requires athletes to perform rapid and precise movements while continuously responding to the actions of an opponent. Competitive fencing involves repeated accelerations, decelerations, lunges, retreats, changes of direction, attacks, parries, and counterattacks. These actions are often performed at high intensity and require a combination of physical, technical, tactical, and psychological abilities.

The physical preparation of fencers is particularly important because technical skill alone cannot guarantee successful performance. A fencer must be able to accelerate rapidly, maintain an effective distance from the opponent, execute an explosive attack, recover quickly, and continue performing precise actions despite fatigue. Among the most important physical qualities in fencing are speed, agility, explosive strength, muscular endurance, flexibility, balance, coordination, and reaction ability. The relative importance of these qualities may vary according to the athlete's specialization, competitive level, individual characteristics, and tactical style.

Modern sports training emphasizes the importance of specificity and individualization. Physical preparation should therefore be closely connected with the actual movement patterns and physiological demands of fencing. At the same time, general physical preparation is necessary to establish an adequate foundation for sport-specific performance and injury prevention. The development of physical qualities should also be organized according to the principles of progressive overload, periodization, recovery, and systematic monitoring. Excessive training loads without adequate recovery can negatively affect performance and increase injury risk.

Analysis of literature. Scientific literature on fencing demonstrates that successful performance is associated with a complex interaction between physical, technical, tactical, and cognitive characteristics.

Turner and colleagues have emphasized the importance of strength and conditioning programs specifically adapted to the requirements of fencing. Because fencing involves repeated explosive

movements, strength and power training can contribute to improved acceleration, lunging ability, and movement efficiency.

Studies of the physiological demands of fencing indicate that the sport involves intermittent high-intensity activity combined with periods of lower-intensity movement and recovery. This means that fencers require both anaerobic capacity for explosive actions and sufficient aerobic fitness to facilitate recovery between repeated efforts. Strength training is particularly relevant to fencing because strong lower-limb musculature contributes to acceleration, braking, lunging, and recovery to the starting position. Core strength also contributes to postural stability and efficient transfer of force between the lower and upper body.

Plyometric training has been identified as an effective method for developing explosive strength. Jumping and bounding exercises can improve the ability of the lower limbs to produce force rapidly, which is directly relevant to fencing movements such as lunges and rapid directional changes.

Agility is another fundamental component of fencing. Unlike predetermined agility tasks, fencing requires the athlete to react to an opponent's unpredictable movements. Therefore, agility training should include both planned movement drills and reactive exercises involving visual or auditory stimuli. Reaction ability is also important because the time available to respond to an opponent's attack may be extremely short. Training methods involving partner drills, visual signals, electronic stimuli, and sport-specific scenarios can be used to develop reaction speed.

Flexibility and mobility are important for maintaining effective fencing positions and reducing unnecessary mechanical stress. Adequate mobility of the hips, ankles, shoulders, and thoracic spine can contribute to efficient movement execution.The literature therefore supports an integrated approach in which physical qualities are developed simultaneously with technical and tactical preparation.

Research methodology. The study employed a theoretical and analytical methodology based on the examination of scientific literature and methodological publications concerning physical preparation, strength and conditioning, sports physiology, and fencing performance.

The following methods were used:

- analysis of scientific literature;
- comparison of physical-conditioning methods;
- synthesis of findings from sports science research;
- analysis of the physiological and biomechanical demands of fencing;
- classification of the principal physical qualities required by fencers;
- theoretical modeling of an integrated physical-conditioning program.

The main physical qualities examined were:

1. speed;
2. explosive strength;
3. agility;
4. muscular endurance;
5. aerobic capacity;
6. flexibility and mobility;
7. balance;
8. coordination;
9. reaction ability.

Research discussion. Speed is one of the most important physical qualities in fencing. A fencer must be able to initiate movement rapidly and execute attacks before the opponent has sufficient time to respond.

Speed development can include:

- short-distance acceleration exercises;
- rapid footwork drills;
- explosive fencing movements;
- reaction-based starts;
- resisted and assisted movement exercises;
- high-speed technical combinations.

Training should emphasize high-quality repetitions with sufficient recovery to maintain movement speed. Explosive strength is particularly important during lunges, directional changes, and rapid recovery movements.

Appropriate exercises include:

- jump squats;
- countermovement jumps;
- split jumps;
- bounding exercises;
- medicine-ball throws;
- loaded jumps;
- explosive resistance exercises.

Plyometric exercises can be especially useful because they develop the ability to generate force rapidly.

However, plyometric training should be introduced progressively and adapted to the athlete's training experience and physical condition. Agility in fencing involves more than simply changing direction quickly. It requires the athlete to perceive an opponent's action, make a rapid decision, and execute the appropriate movement.

Reaction time can directly influence the outcome of an exchange. A fencer who recognizes an attack earlier may have more time to perform an appropriate defensive or offensive action.

Reaction training can include:

- partner-response exercises;
- visual stimulus drills;
- auditory signal drills;
- electronic reaction systems;
- random movement cues;
- fencing-specific attack-response exercises.

Reaction training should be integrated with technical skills so that the athlete learns not only to react quickly but also to select the correct movement.

Although individual fencing actions are short, competitions may require athletes to perform repeated high-intensity efforts over an extended period. Muscular endurance therefore contributes to the ability to maintain movement quality and technical precision under fatigue.

Training methods may include:

- circuit training;
- repeated fencing-action intervals;
- bodyweight exercises;
- moderate-load resistance training;

- sport-specific interval training.

However, endurance training should be appropriately dosed because excessive volumes of general endurance work may interfere with the development of speed and explosive power.

Balance is essential for maintaining body control during attacks, defensive actions, and recovery movements. Because fencing involves rapid transitions between unilateral and bilateral positions, dynamic balance is particularly important.

Coordination training can include:

- single-leg balance exercises;
- movement stabilization drills;
- complex footwork;
- unilateral strength exercises;
- fencing-specific technical combinations.

Core training should support fencing performance rather than simply maximize abdominal muscle strength.Physical qualities should be developed systematically throughout the training year.

Training phase	**Primary objective**	**Main physical emphasis**
General preparation	Establish physical foundation	Strength, mobility, aerobic capacity
Special preparation	Develop fencing-specific qualities	Speed, agility, explosive strength
Pre-competition	Integrate physical and technical preparation	Reactive speed, power, sport-specific endurance
Competition	Maintain performance	High intensity, reduced unnecessary volume
Transition/recovery	Restore physical condition	Recovery, mobility, light activity

The exact structure should be adjusted according to the athlete's competition calendar and individual needs.

Physical conditioning also has an important preventive function. Fencers frequently perform repeated unilateral movements, rapid lunges, abrupt stops, and changes in direction. These demands can place considerable stress on the lower limbs and other anatomical structures.

Preventive training should include:

- unilateral strength exercises;
- posterior-chain strengthening;
- ankle and knee stability exercises;
- hip-strengthening exercises;
- mobility work;
- progressive load management;
- adequate recovery.

A balanced strength program can help address muscular imbalances and improve movement control.

Conclusion. The development of physical qualities is a fundamental component of successful fencing performance. Fencers require a complex combination of speed, explosive strength, agility, muscular endurance, aerobic capacity, flexibility, balance, coordination, and reaction ability. The analysis demonstrates that no single training method is sufficient to develop all of these qualities. An integrated program combining resistance training, plyometrics, speed and agility exercises,

reactive drills, aerobic conditioning, mobility training, and fencing-specific exercises is more appropriate for comprehensive physical preparation.

Particular attention should be paid to reactive agility and reaction ability because fencing requires athletes to respond rapidly to unpredictable actions of an opponent. Strength and explosive-power development should support acceleration, lunging, braking, and rapid recovery. Periodization and individualization are also essential. Training programs should take into account the athlete's age, training experience, weapon specialization, competitive level, physical condition, and competition schedule.

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