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THE ROLE OF WEIGHTLIFTING EXERCISES IN DEVELOPING STRENGTH QUALITIES IN YOUNG TRACK AND FIELD ATHLETES

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Abstract
This article examines the theoretical and practical aspects of using weightlifting exercises to improve the physical fitness of young track and field athletes. It analyzes the importance of exercises performed with barbells, dumbbells, and other resistance equipment in developing muscular strength, speed-strength abilities, explosive strength, and movement coordination in young athletes. Particular attention is also paid to determining training loads according to age, physical development, and sports specialization, teaching proper exercise techniques, and preventing injuries. Based on an analysis of scientific literature, practical recommendations are provided for the gradual incorporation of weightlifting exercises into the training process of track and field athletes.

Keywords: young athletes, track and field athletics, weightlifting exercises, muscular strength, speed-strength abilities, explosive strength, physical fitness, training load.

Introduction

Achieving high performance in modern sports is closely associated with the comprehensive development of athletes' physical qualities. In track and field athletics, strength, speed, agility, coordination, and endurance are essential in most running, jumping, and throwing events. In particular, in disciplines such as sprinting, long jump, high jump, shot put, and javelin throw, athletes' strength and explosive power capabilities directly influence performance outcomes.

Developing strength qualities in young track and field athletes is an important component of long-term athletic training. This process should not be limited exclusively to sport-specific exercises; it is also necessary to use general developmental and specialized training exercises that improve the muscles' ability to generate force. Weightlifting exercises, including squats, pulling movements, barbell lifts with light weights, and technically adapted explosive movements, can serve as effective means of developing strength.

Scientific research indicates that resistance training can improve muscular strength and vertical jump performance in young athletes, as well as positively influence running speed and agility

[1]. However, these outcomes depend on the proper organization of training sessions, individualized load selection, and qualified coaching supervision.

The aim of the study is to analyze the role of weightlifting exercises in developing strength qualities in young track and field athletes based on scientific literature and to develop practical recommendations for their application in the training process.

The objectives of the study are:

- To explain the importance of strength qualities in track and field performance.
- To analyze the effects of weightlifting exercises on the bodies of young athletes.
- To substantiate the principles of exercise selection and training load regulation.
- To provide recommendations for ensuring safety and effectiveness during training sessions.

1. The Importance of Strength Qualities in Young Track and Field Athletes

Strength is the physical ability of muscles to overcome external resistance or oppose it. In sports activities, several types of strength can be distinguished: maximal strength, speed-strength, explosive strength, and strength endurance.

Maximal strength represents the ability of muscles to generate a high level of force. Speed-strength refers to the ability to produce considerable force within a short period of time, while explosive strength is characterized by the rapid development of force. Strength endurance refers to the ability to maintain force production during repeated movements.

The importance of these qualities varies across different track and field disciplines. For example, in sprinting, the speed-strength capabilities of the leg muscles are particularly important during the starting phase and acceleration. In jumping events, athletes must generate force within a very short period during take-off. In throwing events, the coordinated activity of the leg, trunk, and arm muscles contributes to accelerating the sporting implement.

At the same time, the benefits of strength training are not limited to increasing muscular strength. Properly organized training can also contribute to better movement control, improved body stability, and the development of athletes' overall physical fitness [2].

When preparing young athletes, it is important to consider their level of biological development. Athletes of the same chronological age may differ in physical maturity, movement experience, and ability to adapt to training loads. Therefore, exercises should be prescribed not solely according to chronological age but also based on each athlete's individual level of preparedness.

2. The Role of Weightlifting Exercises in Developing Strength Qualities

In this article, weightlifting exercises refer to strength exercises performed using barbells and other free weights, as well as modified forms of technical movements characteristic of weightlifting that are adapted to athletes' levels of physical preparedness. The competitive weightlifting movements of the snatch and clean and jerk involve complex techniques and should be taught to young athletes only under the supervision of qualified specialists.

The following exercises can be used in strength training:

1. Squatting exercises. Squats performed with body weight or light external resistance develop the muscles of the thighs, gluteal muscles, and trunk stabilizers. They help establish the strength foundation required for running and jumping.

2. Pulling exercises. Pulling movements performed with a light barbell or dumbbells develop the coordinated activity of the leg, back, and trunk muscles. Maintaining a neutral spinal position and lifting the weight under control are essential during these exercises.

3. Explosive movements with light loads. For athletes with sufficient technical preparation, exercises involving the rapid but controlled lifting of light weights may be introduced under the supervision of a coach. Such exercises aim to develop the ability to produce force rapidly.

4. Single-leg strength exercises. Step-ups onto low platforms, controlled single-leg squats, and balance exercises help identify strength differences between the legs and improve the control of unilateral movements.

5. Core-strengthening exercises. Planks, side planks, and other stabilization exercises develop the functional capacity of the trunk muscles and help athletes maintain proper body positioning during running, jumping, and throwing.

The effectiveness of exercises performed with weights depends not only on the amount of resistance but also on movement technique, execution speed, number of repetitions, rest intervals, and training duration. Therefore, training sessions should be organized progressively.

3. The Effects of Strength Training on Track and Field Performance

A systematic review and meta-analysis of resistance training included 43 studies involving athletes aged 6–18 years. The findings demonstrated that strength training had moderate positive effects on muscular strength and vertical jump performance, while its effects on linear sprint speed, agility, and sport-specific performance ranged from small to moderate [1].

These findings indicate that exercises performed with weights may be beneficial in the preparation of track and field athletes. However, improvements in strength indicators do not necessarily translate into proportional improvements in competitive performance. This is because athletic performance also depends on technique, speed, coordination, psychological preparation, recovery, and other factors.

For sprinters, strength training can help develop the ability to generate force during interaction between the feet and the ground. In this regard, strength exercises should be combined with sprinting technique drills, starting exercises, and acceleration training.

In jumping events, strength exercises provide the necessary foundation for take-off. However, improving jumping performance also requires the development of the ability to express strength at the appropriate movement speed, as well as the improvement of jumping technique and specialized jumping exercises.

In throwing events, the strength of the leg and trunk muscles, the sequence of movements, and technical coordination are of great importance. Weightlifting exercises can contribute to the

development of general strength, but they cannot replace the technical training specific to throwing events.

Thus, weightlifting exercises should be considered supplementary means of developing the special physical preparedness of track and field athletes. Exercise selection should take into account the athlete's specialization and competition schedule.

4. Methodology for Organizing Strength Training for Young Athletes

When organizing strength training for young track and field athletes, the principles of consistency, individualization, regularity, and safety must be observed. Initially, movement techniques should be taught, after which training loads can be gradually increased according to the athlete's level of preparedness.

The training process can conditionally be divided into three stages.

The first stage – development of movement skills.

At this stage, exercises performed with body weight, light dumbbells, training sticks, or technique bars are used. The main objectives are to develop proper body positioning, control of the range of motion, balance, and coordination.

The second stage – development of general strength.

Once athletes have mastered the correct techniques of the basic exercises, external resistance can be gradually increased. Exercises should be performed with moderate training volume and loads that do not compromise movement technique.

The third stage – development of special strength and speed-strength.

When appropriate for the athlete's age, biological maturity, and level of preparedness, speed-strength exercises adapted to the specific track and field discipline can be introduced. Particular attention should be paid to movement quality, rapid force production, and preventing excessive fatigue.

The following table presents a sample structure of a training session for young athletes.

Training session component	Content	Approximate duration
Preparatory part	Light jogging, dynamic warm-up, mobility exercises	10–15 minutes
Technical preparation	Bodyweight squats, technical movements with a training stick	8–10 minutes
Main part	Squats, dumbbell pulling exercises, core-strengthening exercises	15–20 minutes
Specialized part	Acceleration, jumping, or throwing exercises specific to the sport	8–12 minutes
Final part	Light movements and recovery-oriented exercises	5 minutes

Note: The table is illustrative, and it is not necessary to perform all components during every training session. The duration of each session should be adjusted by the coach according to the athlete's age, overall training load, and level of preparedness.

Performing strength exercises two or three times per week may be appropriate for some young athletes. However, sufficient recovery between sessions and other sporting activities must be taken into account. During the initial stages of training, priority should be given to light resistance, a limited number of high-quality repetitions, and correct technique.

When increasing training loads, it is not recommended to simultaneously and sharply increase the weight, number of repetitions, and overall training volume. Each adjustment should be determined according to the athlete's technical performance, subjective condition, and recovery status.

5. Safety and Injury Prevention

Safety must be the highest priority when conducting strength training with young athletes. Scientific consensus statements and recommendations on sports training emphasize that properly designed resistance training supervised by qualified professionals can be relatively safe for young people and can improve their physical fitness [2, 3].

The following rules should be observed during training sessions:

- Perform general and specific warm-up exercises before training.
- Teach each new exercise initially without additional weight or with very light resistance.
- Increase resistance only when proper technique can be maintained consistently.
- Do not automatically prescribe maximal weightlifting attempts to young athletes; such testing should only be considered when sufficient preparation and appropriate supervision are available.
- Stop exercising if acute pain, dizziness, or unusual weakness occurs.
- Take into account the athlete's sleep, nutrition, recovery, and total training load from other physical activities.

It should also be remembered that athletes' body structures and movement capabilities change during periods of growth and development. Therefore, training programs should be regularly reviewed and, when necessary, medical specialists should be consulted.

6. Assessment of the Development of Strength Qualities

Initial and follow-up testing can be used to determine the effectiveness of training. Tests should be conducted under identical conditions and selected according to the athlete's age and level of preparedness.

The following indicators can be used to assess the development of strength and speed-strength qualities:

1. Technical quality of bodyweight squats and the ability to complete a prescribed number of repetitions.
2. Vertical jump or standing long jump performance.
3. Sprint time over a short distance.
4. Balance and movement coordination indicators.
5. Quality of training load execution and recovery status.

Tests involving maximal weights should not be routinely used as a monitoring method for young athletes. When necessary, strength indicators should be assessed using safe, standardized methods appropriate to the athlete's level of preparedness.

If experimental research is conducted, athletes may be divided into experimental and control groups. Initial and final results can then be recorded and compared using statistical methods. In this process, the athletes' age, biological development, training experience, and other physical training loads should also be taken into consideration.

This article is based on a review of scientific literature and does not claim that new experiments were conducted by the author or that specific percentage-based improvements were achieved.

Discussion

The analysis of scientific literature indicates that exercises performed with weights can be an important means of developing the strength capabilities of young athletes. However, the effectiveness of strength training depends on its content and organization. Training based exclusively on lifting heavy weights cannot be considered the optimal approach for track and field athletes.

In preparing young athletes, it is necessary to combine the development of general strength with movement technique, speed, coordination, and sport-specific skills. In particular, prescribing identical training loads to athletes with different rates of biological development is not advisable.

Furthermore, the effects of strength exercises may vary depending on the sporting discipline. In sprinting and jumping events, speed-strength exercises are particularly important, whereas in throwing events, exercises aimed at developing strength and technical coordination have special significance. Therefore, weightlifting exercises should be planned appropriately in combination with track and field-specific training exercises.

Conclusion

The rational use of weightlifting and other resistance exercises in developing strength qualities in young track and field athletes can contribute to improving the effectiveness of athletic preparation.

Based on the analysis of scientific literature, the following conclusions have been drawn:

1. Strength is one of the important physical fitness factors in running, jumping, and throwing events in track and field athletics.
2. Properly organized resistance training can improve muscular strength and jumping performance in young athletes and, in some cases, may also positively influence sprint speed and agility.
3. Training programs should be individualized according to the athlete's age, biological maturity, technical proficiency, and sporting specialization.
4. Initially, priority should be given to mastering exercise techniques, followed by a gradual increase in training loads.
5. Weightlifting exercises should complement running, jumping, and throwing exercises specific to track and field athletics rather than replace them.

6. When assessing training effectiveness, not only strength indicators but also speed, jumping performance, technical quality, and recovery status should be taken into account.

In general, the development of strength qualities in young track and field athletes should be based on a long-term, scientifically grounded approach that takes individual differences into consideration. Qualified coaching supervision, technically correct exercises, appropriate training loads, and sufficient recovery are the fundamental conditions for developing athletes' physical capabilities and ensuring safe participation in sports activities.

References

1. Lesinski M., Prieske O., Granacher U. Effects and dose-response relationships of resistance training on physical performance in youth athletes: a systematic review and meta-analysis. British Journal of Sports Medicine. 2016; 50(13): 781–795. DOI: 10.1136/bjsports-2015-095497.

2. Faigenbaum A. D., Kraemer W. J., Blimkie C. J. R., et al. Youth resistance training: updated position statement paper from the National Strength and Conditioning Association. Journal of Strength and Conditioning Research. 2009; 23(5 Suppl): S60–S79. DOI: 10.1519/JSC.0b013e31819df407.

3. Lloyd R. S., Faigenbaum A. D., Stone M. H., et al. Position statement on youth resistance training: the 2014 International Consensus. British Journal of Sports Medicine. 2014; 48(7): 498–505. DOI: 10.1136/bjsports-2013-092952.

4. Lloyd R. S., Cronin J. B., Faigenbaum A. D., et al. National Strength and Conditioning Association Position Statement on Long-Term Athletic Development. Journal of Strength and Conditioning Research. 2016; 30(6): 1491–1509. DOI: 10.1519/JSC.0000000000001387.

5. McQuilliam S. J., Clark D. R., Erskine R. M., Brownlee T. E. Free-Weight Resistance Training in Youth Athletes: A Narrative Review. Sports Medicine. 2020. DOI: 10.1007/s40279-020-01307-7.