PLYOMETRIC EXERCISES AS A WAY OF DEVELOPING SPEED-STRENGHT ABILITIES OF SECONDARY SCHOOL STUDENTS AND POSSIBILITIES OF UTILIZATION IN COEDUCATIONAL LESSONS

TIBOR BALGA - BRANISLAV ANTALA
Faculty of Physical Education and Sports
Comenius University in Bratislava
Slovakia

ABSTRACT

Physical education and sports as a subject is a place for developing conditional abilities, advancing expansion of general physical performance and fitness. One of the specific aims of this subject is to teach children how to apply and how to plan ways to develop motor abilities in improving their physical performance and fitness, or bring to bear more physical resources to develop their motor abilities. In our report, we will discuss the development of speed-strength abilities of students using plyometric exercises. The aim of our report is to highlight the possibility of using plyometric method to develop speed-strength abilities of secondary school students during physical education within coeducational classes. The contribution is a part of the Ministry of Education's grant role no.1/0759/12 „Efficiency of coeducational classes of physical education and sport in secondary schools, and its impact on students 'socialization".

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Key words: plyometric exercises, speed-strength abilities, coeducational lessons, secondary school students

INTRODUCTION

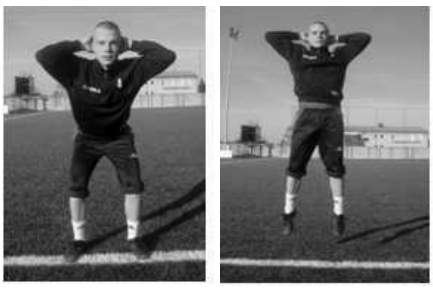
Physical education and sports as a subject is a place for developing conditional abilities, advancing expansion of general physical performance and fitness. One of the specific aims of this subject is to teach children how to apply and how to plan ways to develop motor abilities in improving their physical performance and fitness, or bring to bear more physical resources to develop their motor abilities.

Leg muscle power in general and vertical jump performance in particular, are considered as critical elements for successful athletic performance, as well as for carrying out daily activities and occupational tasks. Most coaches and researchers seem to agree that plyometric training is a method of choice when aiming to improve vertical jump ability and leg muscle power (Markovic, 2007).

Researchers also have shown that plyometric training, when used with a periodized strength-training program, can contribute to improvements in vertical jump performance, acceleration, leg strength, muscular power, increased joint awareness, and overall proprioception. (Miller et al., 2006)

This type of training is based on extending and shortening and is characterized by an abrupt deceleration (eccentric contraction) followed by an as fast as possible change of direction (concentric contraction). This principle is applied within sports that integrate running, jumping and changing the direction of motion into the natural movements (Vanderka, 2006).

Plyometrics refers to exercises that are designed to enhance neuromuscular performance. For the lower body this involves application of jump, hopping and bounding training. Plyometric exercises are implemented in various forms depending on the purpose of the training program. Typical plyometric exercises include the countermovement jump, the drop jump and the squat jump.



These exercises can either be combined within a training program or a subject physical education and sports, or can be applied independently. Furthermore, plyometrics can be performed at various intensity levels (Villareal et al., 2010).

We recommend implementing coeducational schooling in the inclusion of plyometric exercises in the learning process, since the given fact is that secondary education is inclined to coeducation more than the percentage of pupils in primary schools (Dančíková et al., 2012).

In the following part there are some plyometric exercises suitable for developing explosive leg strength of secondary school pupils during physical education and sport within coeducational classes.

1. Cycled Split Squat Jump

Starting position: backward lunge
Jump direction: vertical
Arm's action: none or simultaneous arm swing
Initial activity: start by lowering the centre of gravity about 6-10 cm.
Jumping: explosive bounce of front leg, use the plantar flexion of rear leg, bring your legs together during the non-contact phase.
Landing : before the landing, switch leg position, and immediately repeat the jump

2. Squat jump

Starting position : squat with hands linked behind the head
Jump direction: vertical
Arm's action: none
Initial activity: lower the centre of gravity and then do the maximum jump to the maximum height.
Jumping: the hands are still behind the head in non-contact phase
Landing: land to the squat position and repeat the bounce immediately without the inter-jump

3. Double Leg Knee Tuck Jump

Starting position: medium straddle stand
Jump direction: vertical
Arm's action: simultaneous
Initial activity: lower the centre of gravity (crouched position), then maximal both-leg rebound
Jumping: In non-contact phase pull the knees to the chest and hold them with both hands.
Landing: land to the starting position, repeat the jump without the inter-jump. Focus on the rebound and pulling the knees to the chest.

4. Single Leg Vertical Power Jump

Starting position: one-leg stand
Jump direction: vertical
Arm's action: simultaneous
Initial activity: lowering the centre of gravity is followed by the maximal jump.
Jumping: tendency to reach the highest point in non-contact phase.
Landing: land to the starting position, repeat the jump with no inter-jump. Emphasis on the maximal height of the jump and fast rebound. Repeat the jumps also with the other leg after the rest.

5. Double Leg Vertical Power Jump

Starting position: squat in medium straddle stand.
Jump direction: vertical
Arm's action: simultaneous
Initial activity: lower the centre of gravity (deeper squat) and maximal both-leg jump in consequence.
Jumping: after the arms swing, try to reach the highest point with both hands.
Landing: land to the starting position, repeat the jump with no inter-jump.

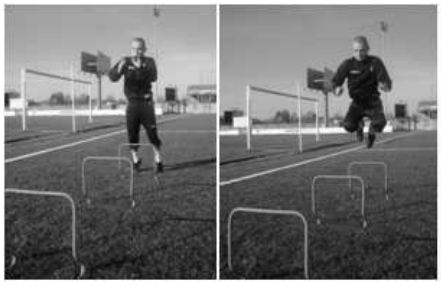
6. Ankle Hops

Starting position: legs are slightly bent in shoulder width position
Jump direction: vertical
Arm's action: simultaneous
Initial activity: lowering the centre of the gravity is followed by the rebound.
Jumping: tendency to reach the highest point in non-contact phase, band the ankle
Landing: land to the starting position, repeat the jump with no inter-jump. Emphasis on the maximal height of the jump, as shortest and fastest rebound as possible

7. Single Leg Speed Hop

Starting position: basic stand with one leg forward, front leg is slightly bend in ankle, knee and hip joint
Jump direction: horizontal
Arm's action: simultaneous
Initial activity: shift the weight to the rear leg and step forward (or slow walking to the starting position), front leg rebound, try to pull your knee forward and up. Tendency to reach the maximal length and adequate height of the jump
Jumping: keep the support leg bend and below the body, bring it forward in non-contact phase
Landing: back to the starting position, repeat the rebound directly after the landing

8. Skater Bounds



Description of exercise: horizontal single-legged side jumps forward

9. Lateral Obstacle Jump

Starting position: medium straddle stand
Jump direction: vertical (diagonal)
Arm's action: simultaneous
Initial activity: crouche position followed by the maximal rebound
Jumping: diagonal jump over the hurdle with simultaneous arm's swing
Landing: land to the starting position and repeat the jump with no inter-jump

10. Front Obstacle Jump

Starting position: legs are slightly bent in shoulder width position
Jump direction: vertical
Arm's action: simultaneous
Initial activity: two-legged jumps over the hurdles
Jumping: jump over the hurdle with simultaneous arm's work
Landing: land and repeat the jump with no inter-jump, rebound is from the frontal part of the feet

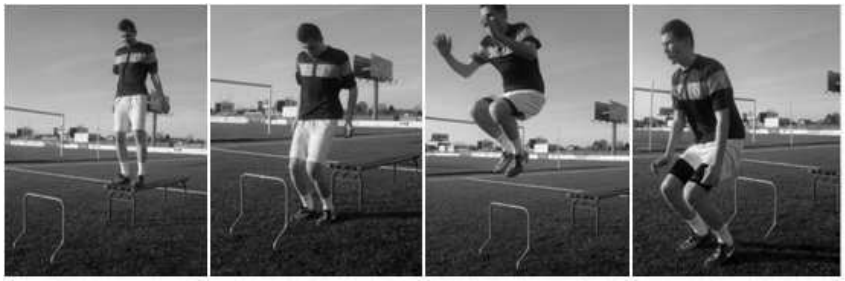
11. Reactive Jumps

Description of exercise: Drop down to the ground from a raised platform and then immediately jump up. We can also add reaching the highest point with both hands.

12. Alternate Leg Bunding

Description of exercise: repeated horizontal high-knee jumps

13. Low Jump – Skip Obstacles



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