

THE IMPORTANCE OF DEVELOPING CORE STRENGTH FOR THE IMPROVEMENT OF 800M RUNNING RESULTS IN U16 ATHLETES

Carmina Mihaela VOROVENCI¹

Abstract: *The purpose of this study is to show the link between a well-developed superior train and athletic performance. The study included 15 athletes between the ages of 14 and 15 years, who were tested to evaluate the strength of the back muscles in the resistance regime, the strength of the abdominal muscles in the resistance regime and the athletic performance in the running test - 800m. From this study it is concluded that the strength programs for the juniors must contain exercises starting from the central segment of the body and then acting towards the extremities (arms and legs).*

Key words: *core, 800m, juniors.*

1. Introduction

In the past several years, the core has increasingly gathered the attention of experts in regards to the improvement of top performance and prevention of injuries [6], [2]. The core muscles are in the centre of all motor chains and are important for the stability of the spine and pelvis [3]. More than that, the core muscles play an important role in the proximal stability for the distal mobility and the function of the limbs during athletic activities [1], [4].

Thus, the core muscles provide the main basis for the endurance of upper and lower limbs through various muscles that are directly involved in athletic performance. Muscle strength has a parallel development in both sexes up to the age of 11-12, its level being identical in smaller

children.

In this sense, Weinek [5] gives some recommendations that one must take into account when one tries to develop strength during childhood, recommendations that are valid also for adults:

1. give the athlete enough time to recover after a strength training session;
2. do not suddenly modify the loads in children and youths whose bodies are not ready;
3. avoid weight training before and during the growth process because of its negative impact on the spine and on the normal body growth;
4. avoid unilateral work that can affect morphologically and functionally the musculoskeletal system;
5. do not perform a long-time static work because it can affect circulation in muscles and in other structures involved

¹ "Vasile Alecsandri" University of Bacau, Department of Physical Education and Top Athletic Performance.

in the work;

6. in order to avoid later injuries, those who want to work on their strength development need to go through an orthopaedic check-up.

Many coaches focus their attention only on the development of lower limb strength, thinking that these are the limbs the athletes use the most. No one denies the importance of that; however, the core is the most important connective element.

2. Materials and Methods

This study comprised three stages: 1) initial testing, 2) training for 8 weeks, and 3) final testing.

The purpose of this study is to show the link between a well-developed core and athletic top performance.

The hypothesis from which this study was designed and carried out asks the following question: "could a specific core strength development training lead to an improvement in the 800m event performance time?"

The methods used during this research were: a) the literature documentation method, b) the observation method, c) the testing method, d) the statistical-mathematical method, e) the measuring and recording method.

The subjects were 15 athletes from the Bacau Municipal Sports Club, aged between 14 and 15, who were assessed through three motor tests: 800m running, endurance back strength, endurance abdominal strength.

Description of the tests - assessment of the endurance abdominal strength through abdominal exercises. The subjects lay on their back with their hands behind their head, knees bent at a 90° angle, ankles held by a teammate; they lift their trunk at a 90° angle, and return, their shoulders touching the floor. The maximum number of performances is recorded.

Assessment of the endurance back

strength through extensions. The subjects lay on their back with their hands behind their head, facing a gymnastics bench, ankles held by a teammate; they lift their trunk until their chin reaches the bench. The maximum number of performances is recorded.

Strength development training program for juniors. The core strength development training sessions were conducted twice a week for 30 minutes, as circuit training, using the resistance band.

Description of the drills:

1. Leg lifting - lying on their backs, the resistance band around their ankles, their arms on the floor and legs straight, the subjects lift one leg up, while the other leg resists and is not moving. Repetition with both legs;

2. "Band Rowing" - the subjects sit down, one part of the resistance band around their soles, the other part in their hands, arms stretched, palms facing each other. They flex their arms and pull them toward them, then return to the initial position. Their backs are held straight throughout the performance;

3. "Bicycle" - lying on their backs, the resistance band around their ankles, their hands on the back of their necks, the subjects lift one bended leg until the right knee is touched by the left elbow. They repeat the motion with the opposite side;

4. Arm-leg extension - the subjects are kneeling, palms on the floor, the resistance band around one sole and in the opposite hand, they lift one arm and one leg at the same time until they are parallel with the floor, then they return to their initial position. Their backs are held straight throughout the performance;

5. "Scissors" - lying on their backs, the resistance band around their ankles, their arms on the floor and legs straight, the subjects lift both legs up. They spread their legs and get them close again, performing a scissor-like motion.

Strength training program

Table 1

Drills	No. of repetitions	Rest time	Break between series	No. of series
Leg lifting	20 rep.	10 sec.	3 min	6 series
"Band Rowing"	20 rep.	10 sec.		
"Bicycle"	20 rep.	10 sec.		
Arm-leg extension	20 rep.	10 sec.		
"Scissors"	20 rep.	10 sec.		

3. Results and Discussions

assess the core strength during the initial testing.

Table 2 presents the markers used to

Core strength assessment - initial

Table 2

Markers	Abdominal strength (no. of rep.)	Back strength (no. of rep.)	Running 800m (sec)
Average	38.6	32.4	155.2
Max. val.	63	74	187
Min. Val.	21	23	145

During the initial testing of the core strength, the following values were observed: for the abdominal strength, the average was 38.6 repetitions, for the back strength, the **average** was 63 repetitions, for the 800m run, the average was 155.2 seconds.

The maximal value for the abdominal

strength was 63 repetitions, for the back strength, 74 repetitions, and for the 800m run, 187 seconds.

The minimal value for the abdominal strength was 21 repetitions, for the back strength, 23 repetitions, and for the 800m run, 145 seconds.

Core strength assessment – final

Table 3

Markers	Abdominal strength (no. of rep.)	Back strength (no. of rep.)	Running 800m (sec)
Average	50.5	40.53	145
Max. val.	77	80	176
Min. Val.	36	30	138

During the final testing of the core strength, the following values were observed: for the abdominal strength, the average was 50.5 repetitions, for the back strength, the average was 40.53 repetitions, for the 800m run, the average was 145 seconds.

The maximal value for the abdominal strength was 77 repetitions, for the back strength, 80 repetitions, and for the 800m

run, 176 seconds.

The minimal value for the abdominal strength was 36 repetitions, for the back strength, 30 repetitions, and for the 800m run, 138 seconds.

In order to highlight the connection between the development of core strength and the 800m run results, in the case of U16 junior male athletes, the Pearson correlation test was used.

Table 4

Correlations between the 800m run and the final assessments recorded for the core strength

Correlations	800m	Abdominal strength	Back strength
800m	1	-.411**	-.488**
Abdominal strength	-.411**	1	.231
Back strength	-.488**	.231	1

The calculation of the correlation between abdominal strength and the 800m run leads to a correlation coefficient of -0.411, which indicates a reverse, good correlation. The calculation of the correlation between back strength and the 800m run leads to a correlation coefficient of -0.488, which indicates a reverse, good correlation.

One can observe that the high number of repetitions recorded for the abdominal strength could positively influence the 800m results. The higher the repetition number, the better the 800m run results.

The same can be said about the high number of repetitions in the case of the back strength. The higher the repetition number, the better the 800m run results.

4. Conclusions

This study aimed to offer a better understanding of the importance of the development of core strength in middle-distance junior runners and to present some drills that would help the coaches achieve the neuro-muscular stability, balance, and control they aim for their athletes.

A stable core is important for the prevention of injuries and for the improvement of top athletic performance. All the specific muscles can be trained because all muscles are important for the stability of the spine.

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