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The Effecet of the Quad-Core Training on Core Muscle Strength and Endurance

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Abstract The aim of training of young football players Quad-Core core muscle strength and stamina is intended to examine whether acute effect. The research is in the range 13-15 and the age of school's football team plays in 36 athletes voluntarily. The specially designed Quad-Core exercise program for young athletes' muscle strength development and muscular endurance was applied for 10 weeks, 3 days a week, 20-25 minutes (warming) in addition to the school team soccer practice. Determination of the acute effects of training athletes practice before and after the sports-specific endurance (plank) test has been applied. Positive improvements have been observed in core muscle strength and endurance of athletes who have been training with Quad-Core for 10 weeks. Quad-Core training pre-test (95,70 ± 8.92) and last test (123,47 ± 10.01) test significant difference statistically between the values ($p > 0.05$). As a result, the 10-week Quad-Core training athletes core muscle strength and endurance has been developing in a positive direction. The development of muscle strength and muscular development age children for their own body weight with Quad-Core training basic skills learning and will contribute to the development of basic motor skills.

Keywords Core, Core Training, Quad-Core, Soccer, Muscle Strength, Muscle Endurance

1. Introduction

The core region, which is defined as the central region of the body; stabilization of the abdominal, paraspinal and gluteal muscles, consisting of the spine, pelvis, abdominal cavity and upper muscle, nerve, skeleton and other connective tissues is critical to optimal performance [7-22]. Athletes, coaches and lifelong physical condition for individuals who want to protect core training has been a training and fitness trend is most commonly used in the field. Also in recent years' core training rehabilitee except for the purpose of; the importance of increased day by day in the fields of exercise and sports studies is emphasized. Appropriate for each age group can be edited core training plays an important role in the development of athletic performance.

Functional limb kinetic chain to create the Center, especially in the transfer of the center point of stabilization and power due to the fact that all the limb movements the waypoint engine and power house (the powerhouse) have been considered. Upper and lower extremity athletic performance in terms of movements supportive role [29]. Functional exercises, acceleration, deceleration, with a strong core stabilization, balance and region [5]. Running many with core muscles and strengthening the musculoskeletal disease (especially the lumbar vertebrae) is aimed at enhancing athletic performance, prevention and treatment [4]. It is estimated that the reinforced core region provides optimum power production and provides for the transmission of power and movement for functional athletic performance [4, 14, 18].

Sports-specific movements are anatomically more zone (shoulder, legs etc) use and because of the importance of the dynamic movements of the force transfer core stabilization and strength refers to the severity of the different concepts. So in addition to the sporting field force, the performance impact of physical motor skills feature becomes important for core stabilization and strength are becoming more noticeable difference. Sporting activities take on the different tasks of the complicated body of core exercise should be used together. This general population interested in therapeutic purposes applied exercise exercise selection (usually based on static contractions, lowest violent exercises) is quite different [15].

In this context, between the upper and lower extremity strength development of core muscles involved in core can improve muscle strength and endurance. Housing development in a balanced manner multifaceted and for Quad-core training Protocol may be important. In this study, four of the body portion (anterior, posterior and lateral) and determination of acute effects of development.

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2. Method

Research control group pretest-post test pattern was used experimental methods. 36 soccer participated in the research. Skaters competed in the random sampling method with the research group (n = 18, age: 14,06±802 year, size: 1,41 ±,093 cm, body weight: 33,11 ± 6,587 kg) and control group (n = 18, age: 13,72±826 years, size: 1.41 ±,102 cm, body weight: 1.41±,102 kg) is divided into equal groups. Providing children, parents of voluntary participation in the survey and has been receiving permission from the institution. Core information about the practice and the metrics that will be applied as both children and their parents are described in detail.

Training Program: The research group applied the Quad-Core training protocol for 10 weeks, in addition to the school team soccer practice, 3 days a week 20-30 minutes (including warm-up), artificial turf football on the school grounds. Call the rest period has been determined up to the time that the transactions are being loaded (1:1). While the control group only participation in soccer practice and, of course, any additional training. In the study, four movements (Figure 1) were selected for Qaud-Core training and for the muscular strength and strength of the four (front, back and sides) sections of the torso. All athletes training load gradually increased compliance. The research groups were 1 week before the first training unit; 4 exercises were applied individually for 8 weeks, errors are corrected and is provided to do the desired movement way (minimizing the burden of the spine, correct breathing, the transverse abdominis and multifudus use of muscles).

Quad-Core Training: Quad-Core only body muscles (anterior, posterior and lateral) combined for a more active way to run a training Protocol. Development of the muscles of the core zone on the side of different researchers for core training movements. Core training, a fundamental part of the oldest and most basic core exercises that plank movement. Plank strengthening and balance performance with core area of development [18]. Plank, muscle strength and force development and the all-round development of each training session is included in the program. In this context, the Quad-Core Training Protocol plank exercise using 4 different (*Figure 1*) of the variation of the core strength and stabilize the body of endurance performance is intended to the development.

Quad-Core Training	**1-2. Week**	**3-4. Week**	**5-6. Week**	**7-8. Week**		**9-10. Week**
	Time/Repeat	*Time/Repeat*	*Time/Repeat*	*Time/Repeat*	*Time/Repeat*	*Time/Repeat*
Front Plank	25 sec x 3	30 sec x 3	35 sec x 3	40sn x 3		45sn x 3
Side Plank (Left)	25 sec x 3	30 sec x 3	35 sec x 3	40 sec x 3		45 sec x 3
Side Plank (Right)	25 sec x 3	30 sec x 3	35 sec x 3	40 sec x 3		45 sec x 3
Back Plank	25 sec x 3	30 sec x 3	35 sec x 3	40 sec x 3		45 sec x 3
Cumulative Time	*5 minutes*	*6 minutes*	*7 minutes*	*8 minutes*		*9 minutes*

Figure 1. 10 Weekly Quad-Core training movements

After a 10-week core training and research groups to determine acute effect and control group and pre-test post-test for athletic performance measurements.

Sport-Specific Strength (Plank) Test: Research Group core muscle strength and balance for the purpose of measuring the performance of Tong et al., by validity and reliability made it work (95%, 0.94-0.99) *with "Sport-Specific Core Muscle Strength & Stability Plank Test"* Protocol has been applied [32]. This Protocol consists of 8 steps and is carried out against time. Participant 1. step basic plank in position 60 seconds, 2. step removes your right arm and wait for 15 seconds, 3. retracting removes his left arm and his right arm in step 15 seconds, 4. step your right leg over your left arm down and removes the 15 second, 5. lower right leg in step removes your left leg 15 seconds, 6. step left leg and right arm removes 15 seconds, 7. step left leg and right arm down right leg and left arm removes 15 second and 8. Returns the position of the base plank in step and waits for 30 seconds. The Protocol consists of 3 minutes' total time. Participants of the test applied by the examiner applied somehow. The experimental protocol to each of the participants was built once.

The data obtained in the research has been entered into the computer. First, research and control groups received pre-test measurements we examined differences between the preliminary test. Evaluation methods of descriptive statistical data mean (X), standard deviation (ss) is used. After a 10-week training program, research and control groups with pre-test and final tests in Group and examined the differentiation between groups. Preliminary test and the final test for Paired Samples t-test analysis. 95% confidence interval of the findings is the significance of 5% (0.05) level.

3. Results

Table 1, mean age of athletes that make up the research group 14,06, 802, averaged 1.41 ±, 093 cm and body weight averages 33,11 ± 6,587 kg.

Table 2. were examined, mean age of athletes that make up the control group 13.72 ±, 826 years, averaged 1.41 ±, 102

and average body weight is 34,57 ± 7,473.

Table 3. participating in the research study were examined, and a control group of athletes, sport-specific endurance (plank) test values between statistically significant difference was found. These results can be explained by represented by the homogeneous distribution of the working group.

Table 4. the 10-week research group applied to the Quad-Core training pre-test (95,70 ± 8.92) and last test (123,47 ± 10.01) test significant difference statistically between the values ($p > 0.05$).

Table 5. the 10-week aerobic and anaerobic participation in soccer practice that provides the control group pre-test (93,12 ± 7,65) and the last test (98,36 ± 9,21) values between statistically significant difference.

Table 6. the 10-week aerobic and anaerobic soccer practice in addition to Quad-Core training applied research group and control group that provides only participation in soccer practice last test (RG: 123,47 ± 10.01; CG: 98,36 ±9,21) comparison of statistically significant differences ($p > 0.05$).

Table 1. Research Group descriptive statistics table

Research Group	n.	Minimum	Maximum	mean	Std.
Age (years)	18	13	15	14.06	, 802
Size (cm)	18	124	157	141	, 093
Body Weight (Kg)	18	23.50	43.10	33.11	6.587

Cm: *Centimeter,* ***Kg:*** *Kilogram*

Table 2. Control group descriptive statistics table

Control Group	n.	Minimum	Maximum	mean	Std.
Age (years)	18	13	15	13.72	, 826
Size (cm)	18	126	148	141	, 102
Body Weight (Kg)	18	23.50	48.20	34.57	7.473

Cm: *Centimeter,* ***Kg:*** *Kilogram*

Table 3. Research and control group pre-test values

Sport-Specific Strength (Plank) Test	n.	Research Group Pretest	Control Group Pretest	t	p
	36	95,70 ± 8.92	93,12 ± 7,65	-4.612	, 369

Table 4. Research group pre-test post-test values

Sport-Specific Strength (Plank) Test	n.	Research Group Pre-test	Research Group Post-test	t	p
	36	95,70 ± 8.92	123,47 ± 10.01	-19.275	**, 000 ***

Table 5. Control group pre-test post-test values

Sport-Specific Strength (Plank) Test	n.	Control Group Pre-test	Control Group Post-test	t	p
	36	93,12 ± 7,65	98,36 ± 9,21	-3.496	, 128

Table 6. Research and control of preliminary test of the final test values

Sport-Specific Strength (Plank) Test	n.	Research Group Post-test	Control Group Post-test	t	p
	36	123,47 ± 10.01	98,36 ± 9,21	-14.248	**, 000 ***

4. Discussion and Conclusions

Derived from the study results obtained, applied to 10-week Quad-Core training child athletes muscle endurance, muscle strength and core can be said to have developed different zones of the region. Core region, core training, core for the treatment of chronic low back pain in endurance, core and core stability issues in the literature, including many researchers by the importance of core training has been specified and the development of physical performance presented reports about [16, 22, 5, 9, 15, 20, 34].

Core strengthening physical performance of the region. Attempts to apply for the development of core performance training according to the results of the research about the topic; is developing the upper and lower extremity forces [27,

19, 9], basic education is effective in development [6], 10-20-30-40 m Sprint performance [1, 31, 8, 13], balance performance [33, 3, 21, 10, 25] with abdominal muscles rectus femoris maximal force, activation [17-11], standing long jump performance and agility [17, 13, 9, 1, 2], long distance running performance [25], throwing the ball forward health [28, 27, 19, 31], the shuttle run performance [35], the speed of movement of the body [26-28] and maximal launch speed performance [24] was reported positively on the development shows.

In the literature about the core muscle strength and the durability of a relationship with physical performance was explored in several authors party [12, 36, 37, 38]. Investigation on female footballers [38] core muscle strength and physical performance physical performance, however, it is not the relationship between the development of strong core training, has been reported to be effective. This results in muscle endurance and strength requires speed, agility and anaerobic power performance with core muscle endurance can be said that the relationship between the important. Another survey conducted on healthy individuals [36], core muscle strength, functional movement and physical performance (throwing the ball backward health, agility and one leg squat) investigated the relationship between. As a result of the research, they reported that there was a relationship between core muscle strength and agility and single leg squat, but there was no association with health ball throwing and functional movement. This weak relationship still upper limb strength improved performance-oriented, including the core emphasizes the importance of training. Another study found that College baseball players [12] isokinetic core strength and physical performance has been found that the relationship between positive direction. This results in you line with core training, core muscle endurance and muscle strength can be said to be important for the development of. A survey on young footballers [9], attempts to apply a 12-week core training with athletes ' plank in the development of the results of the test have been reported. A study on footballers again [1], 8-week core training, the players muscle endurance (plank test) developed. Another survey conducted on athletes [39], to determine the acute effect of core training, spore-specific endurance test protocol was applied to sportsmen. 12-week core training muscle endurance and strength are reported to have developed.

In addition, determining the impact on core training athletic performance for area scan [40]; discussed in the articles, the core training group and the implementation of core training has been quite different from each other they are the content of the report. This difference, core training, and core area focuses on muscle but emphasized that a training model of heterogeneous structure. I mean, core training is quite different from each other, of transactions selected for static and dynamic and made movements in different planes different muscle groups can be said to have developed. Almost all of the physical performance of core training is known to have developed. For this reason, core training into a specific Protocol and will shed light on the later development of research topics and will contribute to the science of training.

As a result, core training, and the benefits are discussed by researchers and reported many positive results. 10-week Quad-Core training athletes core muscle endurance and strength has been developing in a positive direction. The development of muscle strength and muscular development age children for their own body weight with Quad-Core training basic skills learning and will contribute to the development of basic motor skills.

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