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EVALUATION OF EXPLOSIVE POWER AND FLEXIBILITY IN ELEMENTARY SCHOOL CHILDREN OF TIRANA

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Abstract

The primary goal of this study was to evaluate the effects of explosive power and flexibility in elementary school children. Out of the 64 schools from Tirana district, 4 schools were randomly chosen. Merely 148 kids aged 10 to 13 have completed both assessments (the follow-up evaluation occurs after a full academic year). The main purpose of this study was to evaluate the effects of explosive power and flexibility in elementary school children of the 2nd year of elementary school in Tirana city during one year period. To evaluate the explosive power in lower limbs we have used standing long jump, and for measuring flexibility we have used sit and reach test. The Statistical analyses is performed via "IBM Statistics 22". The results, identify an increase by 11 cm from M1 to M2 in standing long jump, while Flexibility test results show that after one year there was no improvement in flexibility but a decrease of 1.03 cm.

The explosive power in children give us a clear picture of the progress of explosive power along one academic year, with an improvement of the power in the bigger muscles but on the contrary the results show a decrease with no improvement of flexibility. The children subjects of this this study did not acquire explosive power and flexibility, which call for specialized instruction in addition to their active engagement in recreational activities and general physical activity.

Key words: *Elementary school children, explosive power of lower limbs, flexibility of lower limbs*

Introduction

Many assessments highlighted the relationship between physical fitness and health outcomes, showing that low physical fitness in kids and teens is associated with obesity, metabolic profiles, cardiovascular disease, and bone health (Buehring et al., 2010; Ortega, F.B et al., 2008).

Studies conducted over an extended period of time have demonstrated a correlation between changes in central and total adiposity, systolic blood pressure, blood lipids, and lipoproteins with changes in muscular fitness from childhood to adolescence (Ruiz et al., 2009). Muscular fitness has also been linked to a lower risk of chronic illness (Stump et al., 2006; Wolfe, 2006), and in both men and women, aspects of the metabolic syndrome have been found to be adversely correlated with muscle strength (Jurča et al., 2005; Wijndaele et al., 2007). Independent of cardiorespiratory fitness, further research has demonstrated that juveniles with high muscle strength had improved lipid metabolic profiles (Vicente-Rodríguez et al., 2003). In order to get reliable estimates of muscular outcomes, it is ideal for muscular power — also known as explosive strength in practical contexts — to be tested in laboratory settings (Wilson & Murphy, 1996). Childhood is a critical time for sensitive performance gains (+10–15% year) to be detected (Catley & Tomkinson, 2011; Sauka et al., 2010). Standing Broad Jump (SBJ) performance in children aged 7–8 is solely based on height and body mass (Halme et al., 2009).

A better cardiovascular profile in childhood and adolescence is already linked to muscular fitness (Ortega et al., 2007). It is also inversely correlated with clustered metabolic risk in childhood and adolescence (Cohen et al., 2014; Artero et al., 2011), additionally, it has been linked to markers of inflammation in children (Steene-Johannessen et al., 2013). Strong evidence also points to a beneficial relationship between children's and teenagers' self-esteem, bone health, and muscular fitness (Smith et al., 2014). Many studies have shown that sedentary lifestyle is not only negative related to body weight, but its impact is shown in the lower physical performance and also many children do not get involved in physical activities in their everyday life, and this puts their health at risk leading them to an inactive lifestyle. Being obese or overweight is negative for body health and for motor ability and coordination skills (Okely et al., 2004).

Objectives

The main purpose of this study was to evaluate the effects of explosive power and flexibility in elementary school children during one year period.

Methodology

Four schools were selected at random from the 64 schools in the Tirana district. 148 children between the ages of 10 and 13 have finished both tests (the follow-up examination takes place following a full academic year). Random selections were made from each elementary school in the Tirana district to serve as research participants. Additionally, classes from each school were selected at random for this monitoring experiment. To evaluate anthropometric measures (body weight, height, BMI), lower limb flexibility using the sit-and-reach test, and lower limb explosive power using the standing long jumping test. A one-year time interval separated the two measurements, measurement 1 (M1) and measurement 2 (M2).

Measuring explosive power of lower limbs with standing long jump

One of the Eurofit tests used to assess upper limb explosive strength is the standing long jump (Eurofit, 1993). The participant must stand at a line drawn on the ground with their feet slightly apart in order to do the standing long jump. The person plants both feet and leaps forward with their arms and knees. The measurement that is recorded is the one that the highest of the three results indicates. If the test taker trips or falls during takeoff, they should repeat the exam. One way to assess lower limb flexibility is with the sit and reach test. The Cooper Institute created the sit and reach test in 2007 to assess the hamstring muscle's flexibility. Sitting at a sit-and-reach box, bending forward as much as feasible, and extending one straight leg as far as possible are the allotted tasks.

Statistical analysis

Statistical Analyses was conducted using IBM SPSS Statistics 22. Pre and post scores for the dependent variables were analyzed using descriptive and inferential methods. The analysis of pre and post measurements were performed by comparing means of dependent variables. Descriptive Statistics methods included: Descriptive Statistics summary tables (Mean, standard deviation, minimum, maximum. Standard deviation. Data distribution was presented using box-plots. Testing research hypotheses, in order to statistically evaluate a possible change between pre and post measurements using t-tests for standing long jump test and flexibility test.

Results

Standing long jump test

According to data analysis, the standing long jump test results ranged from an average of 117 cm in the first year to 128 cm in the second year. Moreover, the minimum measurements in M1 and M2 were 79 and 97 cm, respectively. In the first year, the maximum standing long jump height is 161 cm, while in the second year, it is 175 cm. Children who took the test in the first year had a mean score of 64, and in the second year, it was 74.

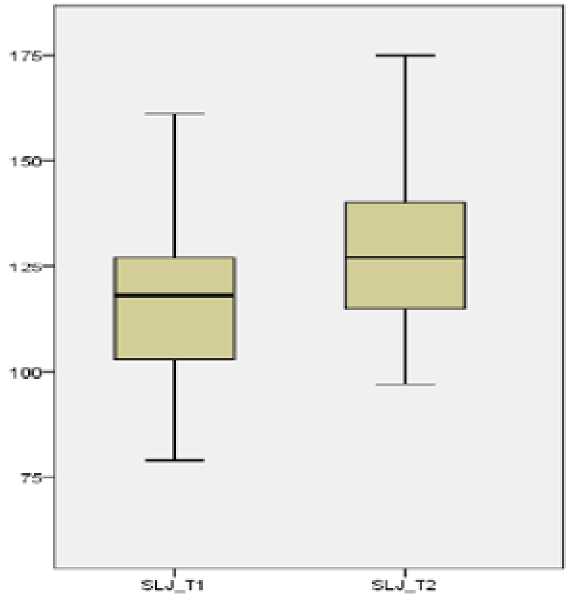

Figure 1. *Standing long jump in the first and second year*

The comparison between the standing long jump test T-tests and variables M1 and M2 is shown in Box Plot 1. The standing long jump has improved, according to the findings of the descriptive statistical analysis comparing M1 and M2. In this test, the variable changes from (117 ± 15.87) at M1 to (128 ± 16.49) at M2, indicating an increase in M2. The two measures were compared using the dependent t-test. The dependent t-test findings ($t(101) = -8.21$, $p < 0.000$) revealed a significant difference ($p < 0.05$) between the two measures, supporting the idea that the lower limbs' power growth happened in a year's time.

Flexibility test

A mean value of 25 cm, a maximum value of 52 cm, and a lowest value of 9 cm are displayed in the flexibility test results. In addition, the flexibility test results showed a standard deviation of 7.2 and a median score of 25 cm after a year. After a year, the flexibility test had minimum and maximum values of 10 and 40 cm, respectively.

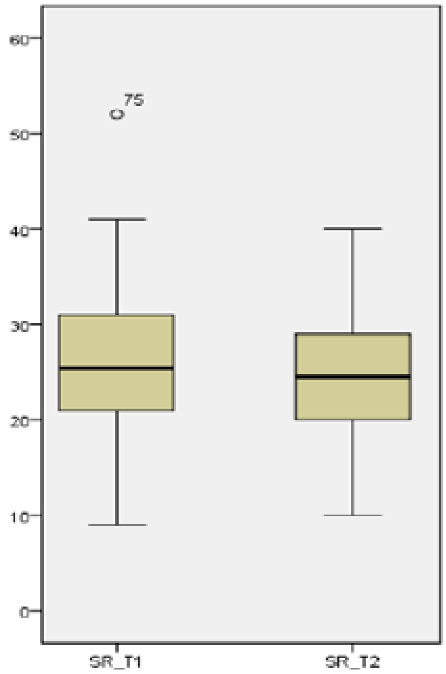

Figure 2. *Seat and reach test*

It is clear from Box Plot 2 when comparing the measurements made before and after a year (M1 and M2). According to the findings of the flexibility test, the variable changed from (25.4±7.2) cm at M1 to (24.4±6.4) cm in the M2, indicating a drop of 1.03 cm. The two measures were compared using the dependent t-test. The dependent t-test findings ($t(91) = 1.62$, $p = 0.109$) show a significant difference ($p < 0.05$) between the two measures, supporting the hypothesis that children's flexibility has reduced by 1.03 cm.

Discussion

Explosive power of lower limbs

The standing long jump scores, which are used to measure explosive strength, show a progression in children's performance from M1 to M2, according to the descriptive analysis. The standing long jump increases by 11 cm at M2, indicating that children's explosive strength is developing. When using the sit and reach test to measure lower back flexibility, body weight appears to have less of an impact. The flexibility test's statistical descriptive analysis revealed a decline in scores from M1 to M2. M2 mark measurements show 1.03 cm less flexibility. The variables for the sit and reach test are (25.4±7.2) cm at M1, and 24.4±6.4) cm at M2.

Conclusions

The end findings from the primary school children's one-year motor skill monitoring program paint a vivid picture of the development of explosive force and flexibility over the course of a school year.

Based on the data collected for this monitoring project, we can conclude that physical education instructors, not general teachers, should put in more professional effort and intervene in the classroom.

The children subjects of this this study did not acquire explosive power and flexibility, which call for specialized instruction in addition to their active engagement in recreational activities and general physical activity.

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