

The effect of a strength training program in physical education classes

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Introduction

The development of motor skills is an integral part of the National Programs of Physical Education (PE). The school, and in particular the PE classes, should play an important role in optimizing motor skills. Currently, teenagers spend most of their time in front of a monitor (e.g. television, computer or cell phone). The strength in the context of PE classes has many limitations (Santos et al., 2012), training must be settled based on functional exercises, without external weight and using limited material. Therefore, the aim of this study was to verify the effect of a specific training program to develop strength performance.

Methods

The study compared two classes, in which one was subjected to a specific exercise training for the development of strength and the other was restricted only to "regular" PE session. 40 students engaged in the tenth grade were analyzed, divided into 2 groups (CG, control group and EG, experimental group) where only one was involved in a specific strength training program performed for 40 minutes, 2 sessions per week, during 10 consecutive weeks. The collection of data on functional strength variables (superior, middle and inferior) occurred during the PE lessons, and the tests were adapted from the Fitnessgram test battery (Chen et al., 2016). The data was collected in two phases with a distance of 10 weeks. The subjects were divided into two groups aged between 14 and 15 years of age. For data analysis, descriptive statistics was used, Kolmogorov-Smirnov test to check the normality, the Mann-Whitney test to compare two independent samples and Wilcoxon test to compare both classes at the same time. Statistical Package for Social Sciences 20.0 was used and the significance level considered at $P \leq 0.05$.

Results

Both groups significantly increased the results obtained in the evaluations (in the push-ups, sit-ups and jump horizontally) between the pre-test (T1) and post-test (T2) (CG: $P \leq 0.001$ and EG: $P \leq 0.000$). Between the two moments, no statistically significant differences were observed in the groups (push-ups: T1, $P=0.180$ and T2, $P=0.333$; sit-ups: T1, $P=0.712$ and T2, $P=0.701$ and jump horizontally: T1, $P=0.2284$ and EG, $P=0.504$).

Discussion

The analysis and comparison of results has shown that the group that engage in the specific plan of exercise training achieved better results in terms of strength but not enough to be

considered statistically significant. These results show that it is possible to improve the strength also during the "regular" PE sessions, if the annual planning and consequent didactic units are properly planned and structured. Strength training has a positive effect in the body of children and adolescents, which contributes to a better and healthier growth (Lo et al., 2017). These workouts must be properly designed and possess a competent supervision and should also be safe and effective.

keywords: Physical Education; Fitnessgram; Exercise Training; Strength.

References

- Lo, K. Y., Wu, M. C., Tung, S. C., Hsieh, C. C., Yao, H. H., & Ho, C. C. (2017). Association of School Environment and After-School Physical Activity with Health-Related Physical Fitness among Junior High School Students in Taiwan. *Int J Environ Res Public Health*, *14*(1) 83; doi:10.3390/ijerph14010083.
- Chen, W., Mason, S., Hypnar, A., & Hammond-Bennett, A. (2016). Association of Quality Physical Education Teaching with Students' Physical Fitness. *J Sports Sci Med*, *15*(2), 335-343.
- Santos, A. P., Marinho, D. A., Costa, A. M., Izquierdo, M., & Marques, M. C. (2012). The effects of concurrent resistance and endurance training follow a detraining period in elementary school students. *J Strength Cond Res*, *26*(6), 1708-1716.