

## REVIEW OF DOCTORAL DISSERTATION

**Reviewer:** Professor Ioannis S. Vrabas (ivrabas@phed-sr.auth.gr)

**Work title:** Physiological and Neuromuscular changes between young soccer players and untrained adolescents. A comparison study.

**Author:** Athanasios Mandroukas

The study examined the effects of soccer training on maximal oxygen uptake, isokinetic muscle strength and anthropometric characteristics in different ages of soccer players and untrained adolescents of the same biological age.

A total of one hundred and twenty-six young soccer players and untrained boys throughout the developmental ages of 12, 14 and 16 participated in the study. Sexual maturation was classified according to Tanner's stages. Soccer players participated both in their school's physical education program and in a soccer training program, while the untrained participated only in their school's physical education program. All participants underwent anthropometric measurements and performed a maximal exercise testing on a motor driven treadmill to determine maximal oxygen uptake and cardiorespiratory indices. Blood lactate concentration was determined in the 5<sup>th</sup> minute of recovery using a lactate photometer. The isokinetic concentric peak torque values of the hamstrings (H) and quadriceps (Q), as well as the conventional strength ratios of H:Q, were measured on an isokinetic dynamometer at different angular velocities.

The results of this study showed that systematic soccer training has a positive effect in the central cardiovascular system expressed as  $\dot{V}O_{2\max}$ , HR and blood pressure, as well as in the peripheral system, expressed as an increased lower limb muscle strength. The results provide important information for more effective training programs.

The discussion section is worthy of attention, since the author demonstrates adequate knowledge of the subject and the conclusions drawn can add knowledge for the sport of soccer.

### Conclusion:

The dissertation is innovative and adds valuable knowledge to the sport of soccer.

The research hypotheses were confirmed by the findings of the study.

The author demonstrated the ability to work independently.

This work meets the standard requirements of the dissertation.

I recommend without any reservations this work for the defense.

### Questions for the defense:

- 1) How the results of the study can be used in order to improve the training methods for the improvement of physical conditioning of adolescents?
- 2) At the tests that were used in your methods what are the differences when measuring adults?

Date:18/9/2019



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