



Conference Abstract

P.60 Improvement in Muscular Strength Within One Year is Associated with Increased Arterial Stiffness in Young Male Soccer Players

MPH Lisa Baumgartner^{1,*}, Heidi Weberruß¹, Katharina Appel¹, Tobias Engl¹, Renate Oberhoffer-Fritz¹, Thorsten Schulz¹

¹Institute of Preventive Pediatrics, TUM Department of Sport and Health Sciences, Technical University of Munich

Keywords

Arterial stiffness
young athletes

ABSTRACT

Purpose: The adaptation process of the cardiovascular system to exercise and muscular strength in young athletes is unclear. Therefore, we investigated the influence of changes in muscular strength and weekly training load within one year on arterial stiffness in young male soccer players.

Methods: 30 male soccer players were examined twice (age t0: 13.3 ± 2.0 years, age t1: 14.2 ± 2.0 years). cSBP and aPWV were measured oscillometrically (Mobil-O-Graph®) and z-scores were calculated. The MoMo physical activity questionnaire recorded the weekly training load and the hand dynamometer measured muscular strength. Height and weight were examined and body surface area (BSA) was computed.

Results: The investigated parameters and the converted z-scores of cSBP and aPWV did not change over time, but handgrip strength (t0: 25.2 ± 10.2 kg, t1: 29.5 ± 10.2, $p < 0.001$) and training load (t0: 7.1 ± 1.5 hours/week, t1: 8.3 ± 2.4 hours/week, $p = 0.005$) increased significantly. 13.3% and 16.7% had cSBP >90th percentile at t0 and t1 respectively. The prevalence of aPWV >90th percentile was 26.7% at both times. Regardless of age and BSA, improvement in handgrip strength was significantly associated with higher values of cSBP ($\beta = 1.66$, $p = 0.009$, $R^2 = 0.42$) and aPWV ($\beta = 0.09$, $p = 0.001$, $R^2 = 0.58$) at t1. An improvement in weekly training load was not associated with cSBP and aPWV at t1.

Conclusion: cSBP and aPWV are negatively influenced by an improvement in muscular strength in young male soccer players within one year. Therefore, in addition to the recommended pre-participation screening, arterial stiffness in young athletes should be monitored annually to detect possible negative outcomes of exercise on vascular health.

© 2020 Association for Research into Arterial Structure and Physiology. Publishing services by Atlantis Press International B.V.
This is an open access article distributed under the CC BY-NC 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>).

*Corresponding author. Email: lisa.baumgartner@tum.de