

## Publication

## Effects of a school-based physical activity program on retinal microcirculation and cognitive function in adolescents

**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4598795**Author(s)** Ludyga, Sebastian; Köchli, Sabrina; Pühse, Uwe; Gerber, Markus; Hanssen, Henner**Author(s) at UniBasel** [Ludyga, Sebastian](#) ; [Pühse, Uwe](#) ; [Gerber, Markus](#) ; [Hanssen, Henner](#) ;**Year** 2019**Title** Effects of a school-based physical activity program on retinal microcirculation and cognitive function in adolescents**Journal** Journal of Science and Medicine in Sport**Volume** 22**Number** 6**Pages / Article-Number** 672-676**Keywords** Adolescence; Cerebrovascular health; Cognitive performance; Exercise; Physical activity**Mesh terms** Adolescent; Child; Cognition; Exercise; Female; Humans; Male; Microcirculation; Physical Education and Training; Reaction Time; Retinal Vessels, anatomy & histology; Schools; Stroop Test

To investigate the effect of combined aerobic and coordinative exercise on retinal microcirculation and its association with changes in cognitive performance in healthy adolescents.; Using cluster-randomization (on class-level), 36 participants were allocated to an exercise group (EX) performing a 20-min aerobic and coordinative exercise session on each school day over a period of 8 weeks or a control group, which was encouraged to have social interactions (CON).; Prior to and following the intervention period, central retinal arteriolar (CRAE) and venular diameters (CRVE) were assessed by use of a static vessel analyzer. Additionally, a computer-based version of the Stroop Color-Word task was administered to assess inhibitory control.; The statistical analysis revealed that EX compared to CON showed higher CRAE at post-test, when pre-test values were accounted for,  $F(1,32)=4.92$ ,  $p=0.036$ ,  $\eta^2_2=0.130$ . In contrast, no such effect was reported for CRVE. With regard to cognitive performance, a greater reduction of reaction time on the Stroop task was observed in EX relative to CON,  $F(1,30)=8.58$ ,  $p=0.006$ ,  $\eta^2_2=0.222$ . The increase in CRAE was significantly correlated with a decrease of reaction time on trials demanding inhibitory control, even after adjusting for covariates,  $r(31)=-0.438$ ,  $p=0.011$ .; A structured exercise program leads to a widening of retinal arteriolar diameters, which is associated with improvements in inhibitory control. Consequently, daily exercise sessions performed during the school break-time can be recommended for promoting both cardiovascular and cognitive health in adolescents.

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