

Effects of Exercise Intervention in Youths with ADHD

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Background/Purpose: Many youths with attention deficit hyperactivity disorder (ADHD) have functional motor performance problems, which may put them into risk for being physically unfit and developing secondary health problems. This preliminary study examined the effects of 12 weekly lessons of exercise intervention on youths, ages 6-14 years, diagnosed with ADHD.

Method: Participants were divided into three groups: ADHD-training ($n = 12$), ADHD-non-training ($n = 12$), and typically developing (TD) non-training ($n = 24$). The exercise intervention lesson held once per week and had a two-part focus: 60-minute of simulated developmental horse-riding program and 30-minute of physical fitness training. All participants received baseline and post-condition assessments using the Bruininks-Oseretsky Test of Motor Proficiency-Second Edition (BOT-2) and the BROCKPORT Physical Fitness Test. For the pre-training, one-way multivariate analysis of variance (MANOVA) and one-way analysis of variance (ANOVA) were performed to evaluate the statistical significance of differences between the groups for the BOT-2 and fitness results, respectively. Analysis of covariance (ANCOVA), controlling for pre-training differences, was used to compare the post-evaluations among groups. Paired t -tests were used to assess the change between the baseline and the post-training evaluations within each group. Effects sizes (Cohen's d) were computed to quantify the magnitude of changes on all dependent measures within groups. A significance criterion was set at $p < .01$.

Analysis/Results: The main findings were that (a) for the pre-training data, both ADHD groups had significantly lower scores on all motor proficiency measures than TD group except upper-limb coordination and balance subtests, and there were no significant differences between the ADHD groups, (b) after accounting for pre-training differences, MANCOVA on total motor composite score indicated that both ADHD groups performing significantly worse than the TD group, and the ADHD-non-training group was significantly worse than the ADHD-training group ($F = 21.15, p < .01$), (c) ANCOVA on fitness measures indicated that the ADHD-training group had significantly higher scores on 20-m Progressive Aerobic Cardiovascular Endurance Run (PACER) ($F = 6.66, p < .01$) and sit-and-reach (right leg, $F = 8.42, p < .01$; left leg, $F = 8.69, p < .01$; left leg) than the ADHD-non-training group at post-evaluations, and (d) the ADHD-training group demonstrated significant improvements (small to large effect sizes; all Cohen's d value ≥ 0.2) on all motor proficiency and physical

fitness measures after the intervention.

Conclusions: Specific interventions to maximize motor proficiency and physical fitness in youths with ADHD are urgently needed.

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