Recent literature emphasizes a positive relationship between physical activity and physical fitness with executive function and academic performance. However, data on the association of muscle fitness with executive function and academic performance is scarce.

**PURPOSE:** To examine the association of muscle fitness with executive function and academic performance in 10-year-old children.

**METHODS:** We included 1069 children (mean (SD) age 10.2 (0.29) years, 48% girls from 58 schools in Sogn and Fjordane county, Norway. Data were collected from August to October 2014. Independent variables were muscle fitness index (standing broad jump and handgrip strength) as well as sex and parental education. Dependent variables were executive function (sumscore of inhibition, flexibility and working memory) and academic performance (mean of grades in Reading, English and Math). We used multiple regression models to examine the association of muscle fitness with executive function and academic performance after controlling for potential confounders. Moreover, we used logistic regression models to estimate the odds ratios (OR) for being in the upper quartile of executive function and academic performance across quartiles of muscle fitness.

**RESULTS:** Muscle fitness index was associated with executive function (β = 0.102, P = 0.001) and academic performance (β = 0.067, P = 0.031) after adjustment for sex and parental education. Moreover the OR for scoring in the top quartile of executive function were 2.22 (95% confidence interval (CI) 1.47 - 3.35) for those in the upper quartile compared with those in the lowest quartile of muscle fitness. Similarly, OR for scoring in the top quartile of academic performance were 1.55 (95% CI 1.04 - 2.32) for those in the upper quartile compared with those in the lowest quartile of muscle fitness.

**CONCLUSIONS:** These findings show that muscle fitness is associated with executive function and academic performance in children. Physical activities that improves muscle fitness should be considered as part in the overall strategy for improving executive function and academic performance in schools.