Universität Basel

Research Project

Effects of martial arts on neurocognition in children born preterm

Third-party funded project

Project title Effects of martial arts on neurocognition in children born preterm
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Background: Children born preterm are affected by deficits in executive function (i.e. top-down control of behavior), which are at the core of academic underperformance and problems in social functioning. Evidence suggests that exercise programs with cognitive and/ or coordinative demands, such as martial arts, improve executive function in healthy children. However, the role of exercise for treating executive function deficits in children born preterm has not been examined yet.
Purpose: The study aims to investigate the effects of a 12-week martial arts program on the inhibitory and working memory aspects of executive functioning in children born preterm. To gain insights on the subtle processes that may contribute to exercise-induced enhancements, the effects are examined on both a neurocognitive and a behavioral level.
Method: The study utilizes a cluster-randomized controlled design, in which 52 children born preterm are allocated to a martial arts group or a (wait-list) control group in a 1:1 ratio. Whereas the control group is encouraged to maintain their usual sports participation, a 12-week martial arts program with two 60-min sessions per week is prescribed to the martial arts group. Prior to and after the intervention period, computer-based versions of the Go/NoGo task and the Change Detection task are administered. Simultaneously, event-related brain potentials (ERP) related to inhibitory processing and working memory capacity are recorded via electroencephalography. Participants' aerobic fitness and motor skills are also measured at both measurement time points. Moreover, intelligence, socioeconomic status and physical activity are assessed as potential confounders.
Practical relevance: The findings are expected to provide first insights into the role of coordinative and cognitively-challenging exercise for children born preterm. These insights may be used to develop efficient exercise interventions that aim to normalize executive functioning in this population.

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