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The influence of a soccer-based cognitive-motor dual-task training in virtual reality on cognitive performance and related brain processing

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Introduction. Proficient soccer players must process substantial amounts of information rapidly while under mental pressure1. This behavior involves specific cognitive anticipatory and decision-making process where both precision and speed are optimized2. While research in the area of sports specific motor training is abundant, the same cannot be said for the cognitive domain3.
Aim. The present study examines the impact of a sport-specific training program based on virtual reality (VR) in young soccer players on cognitive performance and related brain processing using the event-related potential (ERP) method.
Method. Participants were divided into two groups: a control group, which followed a standard soccer training program, and an experimental group, which followed the same training but underwent a VR session once a week.
Results. Results indicated that the experimental group showed a notable enhancement of anticipatory brain activity in the prefrontal negativity (pN). The motor preparatory activity in the premotor cortex, indexed by the Bereitschaftspotential (BP) component, was comparable. Response speed and accuracy were improved in the experimental group. This effect could be explained by increased sensorimotor integration by the prefrontal P1 (pP1) and increased post-perceptual cognitive processing, as decision-making indexed by the P3.
Discussion. This study demonstrated the beneficial effects of sport-specific CMDT VR training on the brain activity of semi-elite soccer players. The improvement of cognitive processes in the experimental group suggests that integrating this protocol into regular training routines may offer a notable advantage in effective cognitive processing, particularly in dynamic, high-stress situations commonly found in competitive sport.

If you're submitting a symposium talk, what's the symposium title?

Sharper minds, Smarter athletes: the Cognitive Side of Sports

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No

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