

Visual event-related potentials in elite and amateur athletes.

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In the present study, we tested the hypothesis that the neural synchronization estimated in visual cortex during visuo-spatial demands shows different features in elite karate athletes when compared to amateur karate athletes and non-athletes. EEG recordings (56 channels; EB-Neuro) were performed from 17 elite karate athletes, 14 amateur karate athletes, and 15 non-athletes, during the observation of pictures with basket and karate attacks. They clicked a right (left) keyboard button for basket or karate attacks at right (left) monitor side. Results pointed to no difference of late occipital VEPs/ERPs after basket versus karate attacks in the non-athletes (300-800 ms post-stimulus). In the amateur karate athletes, occipital VEPs/ERPs at 300-450 ms post-stimulus (P3-P4 components) were lower in amplitude for the karate than basket attacks. In the elite karate athletes, the occipital VEPs/ERPs further declined in amplitude at 300-450 ms post-stimulus (P3 and P4 components) and enhanced at about 800 ms post-stimulus ("N2" component) for the karate than basket attacks. A control study showed that in 10 elite fencers, the same was true for the fencing compared to the karate attacks. These results support the hypothesis that peculiar mechanisms of occipital neural synchronization can be observed in elite athletes during visuo-spatial demands, possibly to underlie sustained visuo-spatial attention and self-control.