

Can Early Cognitive Functions Profiles Predict Long-Term Success in Male Water Polo?

Neven Kovačević, PhD

Croatian Water Polo Federation, Zagreb, Croatia
Faculty of Kinesiology, University of Split, Split, Croatia

Ivan Rukavina, mag. cin

Croatian Water Polo Federation, Zagreb, Croatia

Ognjen Uljević

Associate Professor, Faculty of Kinesiology, University of Split, Split, Croatia

Tea Galić, DMD, PhD

Associate Professor, University of Split School of Medicine, Split, Croatia
University Hospital of Split, Split, Croatia
Croatian Water Polo Federation, Zagreb, Croatia

Abstract

Successful water polo performance requires technical, tactical, physical and cognitive abilities. This study evaluated whether cognitive functions and sport exposure predict long-term competitive level in youth male water polo players. Fifty-nine players, assessed at baseline at 12-15 years of age, completed a computerized Stroop test measuring psychomotor speed and response inhibition. Players were subsequently classified according to long-term competitive level: G1, U18/U19 national-team players (n=18); G2, senior national-league players (n=19); and G3, sub-elite players (n=21) competing at lower senior levels or quit competitive water polo. Playing positions were categorized as goalkeepers (n=10), center players (n=17) and perimeter players (n=32). Sport exposure was presented by years of water polo participation and number of official games played. Significant between-group differences were observed in the number of official games played (G1: 255.56±71.30; G2: 213.47±82.30; G3: 155.95±52.03), with all pairwise comparisons being significant ($P \leq 0.019$). Years of water polo participation also differed between groups (G1: 9.17±0.92; G2: 8.32±1.29; G3: 8.00±1.51), with G1 having significantly longer participation than G2 ($P=0.040$) and G3 ($P=0.015$), while G2 and G3 did not differ ($P=0.657$). Results of the Stroop test did not differ between groups. In multinomial logistic regression adjusted for age, years of participation and Stroop performance, every additional 10 games increased the odds of belonging to G1 versus G3 by 30% (OR=1.30, 95% CI 1.08-1.57; $P=0.006$) and G2 versus G3 by 29% (OR=1.29, 95% CI 1.07-1.54; $P=0.006$). Accumulated game exposure, rather than Stroop-based cognitive function, independently differentiated higher from lower long-term competitive level in water polo players.

Keywords

Water polo, performance, cognitive functions, Stroop test, competitive experience, youth athletes.

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