

Hovik Keshishian and Ian Heazlewood

Talent Identification Based on Biomechanical, General Motor Fitness and Sport Specific Fitness Differences in Elite, Intermediate and Novice Ability Male and Female Karate Athletes

Introduction: Minimal research based on karate athletes indicated some general motor fitness and sport specific motor fitness factors have differentiated karate ability, however these studies are based on extreme differences in ability level. The research aim was to extend upon limited earlier research and evaluate the differences between a cross-section of karate ability levels as male and female karate athletes. Methods: The research was approved by a university research ethics committee. The sample size consisted of adult males classified as elite (n=38), intermediate (n=17) and novice (n=17) and female elite (n=10), intermediate (n=6) and novice (n=15) based on years of participation and belt qualification levels. Within each gender groups there were no significant differences in age, height or weight. The general motor fitness tests were adiposity, Margaria-Kalamen power test, Wingate peak power and power/weight, standing long jump, isometric grip strength, Monark arm crank, general balance, general flexibility, isokinetic right and left leg extension/flexion at 60, 180, 300 and 500 deg/s. The karate specific tests included reverse punch for speed, force, and punch response reaction time, karate agility and karate lateral split flexibility. A one-way ANOVA was conducted for each variable with Sheffe post hoc comparisons. Stepwise discriminant function analysis was applied to assess the value of the multiple test scores in correctly classifying athletes into their respective ability groups. Results: Both general and karate specific test scores displayed significant differences between elite, intermediate and novice ability groups in this order where elite had the higher scores than intermediate and then novice. For males the differences occurred for general motor fitness factors of adiposity, standing long jump, isometric handgrip strength, arm crank, general balance, general flexibility, left-right flexion at 300 deg/s and left-right flexion at 500 deg/s. The karate specific tests that identified significant difference between groups and favouring the elite were punch force, punch speed, punch response time, karate agility and karate flexibility. For females general motor fitness tests of Margaria-Kalamen power test, balance, arm crank, isokinetic flexion at 60, 180, 500 and extension 500deg/s were significantly different in favour of the elite, intermediate and then novice. The significant difference in karate specific tests were karate agility, punch response time, punch speed and karate flexibility in favour of the elite, intermediate and then novice. Discriminant analysis managed to classify athletes correctly into ability groups 81.9% for males based on arm crank, karate flexibility punch power and punch speed 100cm; and 83.9% for females based on balance, punch speed at 50cm and karate agility. Conclusion: Karate ability levels produce different general motor fitness and karate/sport specific test profiles, which indicate that elite athletes have significantly higher scores for both types of testing sets. This information would be valuable in talent identification and training for factors that discriminate/predict karate ability based on both general motor and karate specific tests.