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The Use of Neural Network Technology to Model Swimming Performance

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ABSTRACT

The aims of the present study were: to identify the factors which are able to explain the performance in the 200 meters individual medley and 400 meters front crawl events in young swimmers, to model the performance in those events using non-linear mathematic methods through artificial neural networks (multi-layer perceptrons) and to

assess the neural network models precision to predict the performance. A sample of 138 young swimmers (65 males and 73 females) of national level was submitted to a test battery comprising four different domains: kinanthropometric evaluation, dry land functional evaluation (strength and flexibility), swimming functional evaluation (hydrodynamics, hydrostatic and bioenergetics characteristics) and swimming technique evaluation. To establish a profile of the young swimmer non-linear combinations between preponderant variables for each gender and swim performance in the 200 meters medley and 400 meters font crawl events were developed. For this purpose a feed forward neural network was used (Multilayer Perceptron) with three neurons in a single hidden layer. The prognosis precision of the model (error lower than 0.8% between true and estimated performances) is supported by recent evidence. Therefore, we consider that the neural network tool can be a good approach in the resolution of complex problems such as performance modeling and the talent identification in swimming and, possibly, in a wide variety of sports.

Key words: Evaluation, age group swimmers, individual medley, front crawl.

Key Points

- The non-linear analysis resulting from the use of feed forward neural network allowed us the development of four performance models.
- The mean difference between the true and estimated results performed by each one of the four neural network models constructed was low.
- The neural network tool can be a good approach in the resolution of the performance