Motricidade
ISSN: 1646-107X
motricidade.hmf@gmail.com
Desafio Singular - Unipessoal, Lda
Portugal

Coelho, J.; Cruz, A.M.; Marinho, D.A.; Marques, M.C.; Costa, A.M.; Silva, A.J.; Barbosa, T.M.
Preliminary attempt to develop a path-flow analysis model for swimming performance in children
Motricidade, vol. 5, núm. 3, 2009, p. 69
Desafio Singular - Unipessoal, Lda
Vila Real, Portugal

Preliminary attempt to develop a path-flow analysis model for swimming performance in children

J. Coelho [1], A.M. Cruz [1,4], D.A. Marinho [2,4], M.C. Marques [2,4], A.M. Costa [2,4], A.J. Silva [3,4], T.M. Barbosa [1,4]

1 - Polytechnic Institute of Bragança, Bragança, Portugal
2 - University of Beira Interior, Covilhã, Portugal
3 - University of Trás-os-Montes and Alto Douro, Vila Real, Portugal
4 - Research Centre in Sports, Health and Human Development, Vila Real, Portugal

The aim of this research was to develop a path-flow analysis model from young swimmer's performance based on biomechanical and energetic parameters. The theoretical model was developed according to main review papers about these relationships (e.g. Barbosa, Bragada, Reis, Marinho, Carvalho & Silva, 2009).

22 male swimmers (12.67 ± 0.49 years old) with several competitive levels were evaluated. After a maximal 25-m swim with an underwater start it was computed in the middle 15-m the stroke frequency, stroke length, swim velocity, stroke index and propulsive efficiency. Critical velocity was computed based on the swimmers curriculum on the 200m and 800m freestyle events. Swimming performance was assessed by the 200m freestyle event. Path-flow analysis was performed with the estimation of linear regression standardized coefficients between the exogenous and endogenous variables. When appropriate, according to the theoretical model, simple or multiple linear regression models were computed. The standardized regression coefficients (β) were considered and significance of each β was assessed with the t-Student test ($p < 0.05$). The effect size of the disturbance term for a given endogenous variable, which reflects unmeasured variables, was 1-R2. To verify the quality of the model, root mean square residuals (RMSR) was also computed.

The confirmatory model explains 54% of swimming performance. RMSR was 0.064. In this sense, the confirmatory path-flow model can be considered as being suitable of the theory presented. As a conclusion, training control and evaluation process of young swimmers can be based on biomechanical and energetic parameters.

Key words: swimming, biomechanical, physiological

Barbosa, T.M., Bragada, J.A., Reis, V.M., Marinho, D.A., Carvalho, C., & Silva, A.J. (2009). Energetics and biomechanics as determining factors of swimming performance: Updating the state of the art. *Journal of Science and Medicine in Sports, in press*.