

## ***Genetic predisposition and the breaststroke biomechanics in swimmers of a youth national team***

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### **Introduction**

Genetics is becoming a popular research outcome for talent ID and as co-variable in intervention or longitudinal researches. The aim of this research was to assess the association between genetic predisposition and several biomechanical variables at breaststroke in swimmers of a youth national team.

### **Methods**

Eleven young swimmers from a youth national swim team (eight males and three females) took part in this study. Blood spots were collected for DNA extraction to determine ACE-I/D (II, ID, DD) and ACTN3-R577X (RR, RX, XX) polymorphisms by PCR-RFLP methods (Costa et al, 2012); and assess the strength power predisposition (0 alleles=no-predisposition; 4 alleles=maximal predisposition). As a dry-land strength power measure, three countermovement jumps and squat jumps on a contact mat (Ergojump Digitime 1000, Digest, Finland) were collected, respectively (Garrido et al., 2010). The time and height of the jumps, mechanical work and elastic index were selected as variables. Swimmers undertook a set of 3x25-m maximal trial at Breaststroke. A speedo-meter cable (Swim speedo-meter, Swimsportec, Hildesheim, Germany) was attached to the subjects' hip to measure the stroke's average and the maximal speeds (Barbosa et al., 2013). It was calculated the spearman's correlation matrix between all selected variables.

### **Results**

Overall, genetic predisposition was associated with the countermovement and squat jumps mechanical work ( $R_s=0.73$ ,  $P=0.01$  for both) but not with the maximal and mean speeds. Dry-land jumps were associated with maximal speed ( $R_s=0.59$ ,  $P=0.03$ ) and this one to the average speed ( $R_s=0.92$ ,  $P<0.001$ ). Hence, a path-flow might be suggested between genetic predisposition, dry-land strength power, maximal speed (related to the breaststroke kick, i.e., aquatic strength power) and average speed.

### **Conclusions**

It can be concluded that in elite youth swimmers the genetic predisposition may play a strong and meaningful role on swimming biomechanics.

### **References**

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### **Presenter**

Dr Tiago Barbosa received a PhD in Sport Sciences—Biomechanics and Physiology from the University of Porto, Portugal. Tiago is with a special leave from the Polytechnic Institute of Braganca (Portugal) where he holds an associate professor position, being at this moment a faculty staff at the Nanyang Technological University (Singapore). Besides that, he holds a part-time position as scientific consultant and sports analyst for the Portuguese Swimming Federation.