

A KINEMATICAL, IMAGIOLOGICAL, AND ACOUSTICAL BIOFEEDBACK SYSTEM FOR THE TECHNICAL TRAINING IN BREASTSTROKE SWIMMING.

Lima AB^{1,2}, Semblano P³, Fernandes D³, Gonçalves P¹, Morouço P¹, Sousa F¹, Fernandes R¹, Barbosa T⁴, Correia MV³, Tani G⁵, Vilas-Boas JP¹

¹University of Porto, Faculty of Sport, Porto, Portugal

²University of Ceará and University of Fortaleza, Fortaleza, Brazil

³University of Porto, Faculty of Engineering, Porto, Portugal

⁴Department of Sports Sciences, Polytechnic Institute of Bragança, Portugal

⁵University of São Paulo, São Paulo, Brazil.

INTRODUCTION

A system for real time velocimetric feedback, and for immediate disposal of kinematical data, and model, synchronized with dual-media video images, will be presented.

DESCRIPTION

The system is composed by three different unities: (i) a dual-media image setup (Vilas-Boas et al., 1997), upgraded for images in follow up; (ii) a cable speedometer (Lima et al., 2006), and (iii) a FM transmitter/receiver system, adapted for swimming use, and able to deliver real time velocimetric information to the swimmer and coach. The dual-media follow up images setup uses a special chariot to move, along the lateral wall of the pool, a set of two video cameras: one underwater camera (Submergible AC230V), and one over-water (JVC GR-SX1, SVHS). The images of both cameras are mixed (Panasonic Digital AV Mixer WJ-AVE5), edited (Sony Color Triniton TV monitor) and recorded (Panasonic AG-7350). Differences in refraction are corrected using the zoom optics of the over-water camera, and a calibration device. The dual-media images are mixed with the display of a PC with kinematical information provided by the speedometer. This is a device for measuring the rotational velocity of a cylinder over which a fine nylon cable is passing through. This cable is fixed to the swimmer at hip's level. The movement of the cylinder is monitored by a rotating incremental coder connected to a microcontroller (PIC18LF1320, Microchip). A electrical brake motor allow the reduction of the inertia of the all system, keeping the cable straight, and also allows the cable recoil action. The speedometer was also equipped with a audio output, that allow a sound of variable frequency to be sent to the swimmer and coach through AM/FM receivers (Roadstar TRA-2221D) placed below the swimmers cap.

RESULTS

Results are v(t) real time curves, synchronized with images, and with corresponding auricular sounds. The software also allows the immediate modelling of a typical stroke cycle, both bimodal or trimodal, displaying mean velocities in noticeable points, mean phase durations and accelerations.

REFERENCES

Vilas-Boas J.P., Cunha, P., Figueiras, T., Ferreira, M., Duarte, J.A. (1996). Movement analysis in simultaneous swimming techniques. In: K. Wilke, K. Daniel, U. Hoffmann, J. Klauk (eds.) Symposiumsbericht Kolner Schwimmsportage.

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DYNAMOMETRIC SYSTEM FOR THE EVALUATION OF SWIMMING TURNS.

Pereira S^{1,2}, Roesler H², Esteves C¹, Gonçalves P¹, Sousa F¹, Conceição F¹, Machado L¹, Lima A^{1,3}, Vilar S¹, Fernandes R¹, Vilas-Boas JP¹

¹University of Porto, Faculty of Sport, Porto, Portugal

²State University of Santa Catarina, Florianópolis, Brazil

³University of Ceará and University of Fortaleza, Fortaleza, Brazil.

INTRODUCTION

A system for the dynamometric evaluation of swimming turns will be presented.

DESCRIPTION

The system is composed by one underwater force plate, specifically developed for this purpose, and based on the general characteristics described by Roesler et al. (2003). The force plate is fixed to the ending wall of the pool through a specific structure conceived for this purpose.

The force plate is connected to a PC using a Biopac (Biopac Systems HLC100) A/D converter, operating under control of the Acknowledge software.

Landmarks in the bottom of the pool needed to be changed in order to keep the official distance from the "T" mark to the ending wall.

RESULTS

The system displayed allow the assessment of variables such as:

- (i) contact time;
- (ii) impulse time;
- (iii) horizontal component of the platform reaction force;
- (iv) horizontal impulse.

Results also allow perceiving the effect of different turning techniques on the measured parameters, as well as the effects of different variants of one same technique.

CONCLUSION

Results provided for such a dynamometrical setup allow swimmers to test their best solutions for turning actions, as well as to train their technique, disposing of immediate feedback about critical variables for the performance in this particular action.

DEVELOPMENT OF A MULTI-MEDIA SYSTEM FOR KINESIOLOGICAL EVALUATION OF SWIMMING BY EXPERTS IN ANY POOL.

Soons B, Colman V, Persyn U

Faculty of Kinesiology and Rehabilitation Sciences, K.U.Leuven (Leuven), Belgium.