ABSTRACT

Chronobiology is the systematic study of the temporal characteristics of the living matter in all his organisation levels being the science that researches and quantify the mechanisms of the biological temporal structures (Halberg, Carandente, Cornelissen & Katinas, 1977). Although the rhythmicity in several organisms has been described since old ages Chronobiology as science has been recognised only in 1960 after the realisation of the Cold Spring Harbor Symposium on Biological Clocks, where rigorous methodologies have been adopted on the experimental design and on the statistical and mathematics models of the biological rhythmicity (Cipolla-Neto, Marques & Menna-Barreto, 1988). In this work we present the history of this science internationally and in Portugal and we develop its principal concepts.

Most authors refer the influence of the biological rhythms in the performance in general and in sports performance in particular. Because the preponderance that even the small variations have in the high competition, where the conditions given to the athletes are very equal, the little variations in often neglected factors [what Rodríguez e Ibañez (2000) call the invisible training] have great importance. So, we decide to do an investigation about the influence of the biological rhythms on sports performance having defined the following hypothesis:

- There are significant differences on the times achieved in the morning and in the afternoon on 100 meters crawl swimming;
- There are significant differences between morning and afternoon on self-rated alertness, perceived effort, tiredness, humour states and choice reaction times;
- There is superposition between variations on self-rated alertness, perceived effort, humour states and times obtained on the 100 meters crawl swimming;
- Motivation is a predictive variable of the performance in interaction with other variables;
- Differences in performances between morning and afternoon are equally observed on Regionals and Nationals competitions in Summer and Winter.

Twelve swimmers who belong to a northern country club compose our sample. In accordance with the investigations realised until now our hypothesis have been only partially confirmed. We discuss these results as well as the methodology used.

One of the factors that can be important for surpassing the constraints provoked by biological rhythms is toughness, conceptualised as the capacity to respond to difficult situations and to cope with adversity. We present a heuristic model of toughness.

We present suggestions for future studies, which seem important considering the fact that investigations on the influence of biological rhythms in the sports performance are rare.

In the end we present practical suggestions for persons working diary with athletes since one of the most important functions of a sports psychology researcher is answering practical concerns posed by coaches and athletes (Griffith, 1925, cit. Gould, Greenleaf, Guinan & Chung, 2002).

So, as Bernard, Giacomoni, Gavarry, Seymat e Falgairrette, (1998) defend we think that time of day variations must be considered by athletes, coaches and scientists in the planning of research, trainings and competitions.