Reference change values of some current blood parameters in sports science in physically active subjects #61

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The training monitoring by blood analysis and performance tests may be useful to improve performance. However, effective interpretation of data should take in account the inherent biological and analytical variation. To verify if the difference between two serial results is significant and biologically relevant it can be calculated the Reference Change Value (RCV) from the following formula: $RCV = (2)^{1/2} * Zp*(CV_A^2 + CV_I^2)^{1/2}$, where: $2^{1/2}$=to verify difference between 2 moments, Zp=Z score (probability 95% =1.96), CV_A=analytical coefficient of variation and CV_I=intra-individual coefficient of variation. The difference between two consecutive results compared to a calculated RCV make possible the discrimination between pathological states or training induced changes from normal biological variation. However, the RCV is a useful tool to detect the type I error (false positive) but not type II error (false negative). The aim of this study was to calculate the biological and analytical variation for some blood analysis used for training monitoring in physically active subjects. Blood samples were collected from 56 subjects (males, 17±2 years) 4 times during 3 months of systematized aerobic training. The between and within-subjects CV and the RCV were calculated. The results showed that the RCV calculated for the leukocytes count, neutrophils, C-reactive protein and creatine kinase were higher when comparing to values from sedentary subjects described in the literature. The red blood cells RCV's were similar to sedentary subjects. In practice these results showed that some parameters were more sensitive to training effects than others.

Key words: biological variation; reference change value; critical difference; training; hemogram.