ABSTRACT FORM

ISEI Abstract – 7

Reproducibility of creatine kinase: how useful is this measurement tool?

CHRISMAS BCR[1], TAYLOR L[1], CARROLL S[2], SMITH A[3], PEMBERTON P[3], SIEGLER JC[4] and MIDGLEY AW[5].

[1] Applied Sport and Exercise Physiology (ASEP) & Muscle Cellular and Molecular Physiology (MCMP) research groups, Institute of Sport and Physical Activity Research (ISPAR), Department of Sport & Exercise Sciences, University of Bedfordshire, Bedford, UK.

[2]Department of Sport, Health & Exercise Science, The University of Hull, Hull, UK.

[3]Department of Clinical Biochemistry, Central Manchester Foundation Trust, Manchester, UK.

[4]School of Science & Health, University of Western Sydney, Sydney, Australia.

[5]Department of Sport & Physical Activity, Edge Hill University, Ormskirk, UK.

ABSTRACT

Establishing the reproducibility of a measurement is essential for repeated testing to ensure that any systematic change is a result of an external influence (i.e. intervention), as oppossed to normal random variation. Although some degree of error is inherent in any measure, a measurement tool should yield consistent results that do not fluctuate to an unacceptable degree from one test to another. Creatine kinase (CK) is consistently measured in the blood as a marker of exercise induced muscle damage (EIMD). However, its usefulness as a predictive tool to examine the temporal pattern, and magnitude of muscle damage has been questioned. **PURPOSE:**The main aim of the present study was to employ a variety of reproducibility statistics in order to examine the typical level of measurement error for CK. **METHODS:** Fifty (36 male, 14 female), apparently healthy participants completed three trials on three separate occasions with each trial separated by 48 - 72 h. The initial trial served as a familiarisation. During trials 2 and 3 (48 h), CK measures were obtained using standard fingerprick technique, and analysed in duplicate immediatley using a colorimetric assay procedure. Each participant completed their trials at the same time of day, following identical pre-test procedures. **RESULTS:** The intra-test coefficient of variation (CV) within our laboratory was 9%. Dependent t-tests indicated there was no systematic bias between trials ($p = 0.82$). The interdian CV displayed low reproducibility (20%). Furthermore, the 95% limits of agreement (LoA) were -69.7 to 63.5 iμ/L. However, the intraclass correlation coefficient (ICC) was 0.90, which can be clasified as displaying 'high' reproducibility. **CONCLUSION:** The interdian CV demonstrates that under identical resting conditions (48 h apart), CK displays inherent low absoulte reproducibility, which may obscure a true experimental effect. However, interpretation of the ICC, suggests that CK has high relative reproducibility. The high range of observed CK values is thought to have increased the size of the correlation. Subsequently, an indivdual change in CK following EIMD may not be indicative of the magnitude of damage, and may simply be a result of the inherent variation (e.g. biological). Therefore, it is advised that caution should be taken when using CK within experimental research, and as an indication of when an athlete has recovered, and is able to recommence training.