



Faculty of Physical Education and Sport
Charles University in Prague
José Martího 31
Prague 6, 162 52
Czech Republic

The report on a habilitation work entitled „The effects of cluster sets and rest redistribution on acute resistance training sessions“ by James J. Tufano, Ph.D.

The habilitation work consists of previously published findings in peer-reviewed journals. The candidate is a first author in six out of ten articles. He presents series of studies that sought to investigate the use of cluster sets and rest redistribution in resistance training. The author showed how set structures can be manipulated to create alternative resistance-training methods for enhancement of strength and power output.

This topic is interesting and it may contribute to the current state of knowledge by getting objective insight into the acute effects of set-structure, training load, and rest interval duration and frequency on hypertrophy, strength, and power produced during resistance exercises. A better understanding of how resistance-training variables can be manipulated to provide a great amount of total mechanical work performed by athletes may enable exercise professionals to design smart exercise regiments for improvement of their performance. Managing the training programs in such an effective and efficient manner by manipulating set designs could contribute to the reduction of neuromuscular fatigue and at the same time increase strength and power output.

The candidate clearly indicated the problem being investigated („to investigate the acute effects of cluster sets and rest redistribution using high volume back squats and other multi-joint movements such as the clean pull exercise“, page 23). Aims of individual studies are clearly formulated. Materials and methods used reflect tasks of individual studies and correspond with scientific principles. Proposed experimental design is able to test the hypotheses posed. I would omit the central hypothesis („It was hypothesized that different CS protocols would result in different mechanical and hormonal responses when compared to TS and that the frequency and duration of the intra-set rest periods would play a large role in



managing acute neuromuscular fatigue“, page 28) as it does not specify „different CS protocols“ and „different mechanical and hormonal responses“.

The literature review is comprehensive with many relevant papers in the field of this habilitation work. The chapter 2, as it stands, does concisely focus on aspects that argue in favor of the novelty and high relevance of research studies included in the habilitation work. However, I would expect a systematic review published in 2017 to be completed by up-to-date papers associated with a topic of this work.

Since the studies included in the habilitation work have been published in peer-reviewed journals („the body of the text, the information in the tables and figures, the general messages and conclusions, and the references have not been altered in any way“, page 30), a summary evaluation report can only be made.

The design of individual studies is appropriate. Material and methods are correctly described. The sampling in some studies seems to be sufficient. However, the limitation of other studies is a relatively small sample size consisting of 8-12 strength-trained men. For this reason, these findings cannot be generalized to the broader community based on these studies alone. I believe that an a priori power analysis for estimating appropriate sample size was provided. The inclusion and/or exclusion criteria for subjects to be allocated to the study are sufficiently specified. However, it is not reported whether the test for normality and the test for equality of error variances were performed (except for studies in chapters 7, 10 and 11). The candidate adequately explained how the data was collected. I appreciate clearly described test procedures and parameters analysed. Sufficient information was provided to replicate these research studies. In the light of individual research tasks, statistical methods are adequate.

Findings are arranged in a meaningful way and explained in words what the candidate discovered in the research. The appropriate data analysis was conducted and results are well described with respect to research tasks. Figures and tables are consistent and accurately inform the reader.

The discussion in individual studies is presented in a systematic and structured way. It reflects what the candidate found and how it relates to the literature. The candidate incorporated previous research into the interpretation of results. He demonstrated an appropriate understanding of previous research on the topic and included related references.



Conclusions of the habilitation work are presented briefly and sufficiently accurate. Relevant limitations of this research are also discussed. In addition, future directions are included.

Overall, the habilitation work is well structured with proper balance between the chapters. After a short general introduction, a systematic review of relevant literature that include previous research on the topic is provided. Aims of this work are completed by hypotheses. Approaches and methods used are appropriate. Experiments are described on a high scientific level. Results clearly present findings of individual studies. The well-organized discussion, built upon previous research, is followed by the most important conclusions.

Findings are in my opinion of relevance to the field of exercise science and their interpretation is in accordance with the scientific standards required by this type of work. Their applications for enhancement of strength and power output in resistance-trained men, that are not currently addressed in the literature, are presented. However, further studies are needed to investigate the effectiveness of various set structures for improvement of sport-specific performance.

The candidate has sufficiently proven his capability to identify scientific problem, analyze relevant literature, select appropriate methods, design scientific experiments, collect and process data, present and discuss results and formulate conclusions.

I do recommend the habilitation work by James J. Tufano, Ph.D. entitled „The effects of cluster sets and rest redistribution on acute resistance training sessions“ for approval.

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Erika Zemková, Ph.D.
Professor of Sports Kinanthropology
Department of Biological and Medical Sciences
Faculty of Physical Education and Sport
Comenius University in Bratislava
E-mail: erika.zemkova@uniba.sk
ORCID ID: 0000-0003-0938-5691