

The influence of repetition duration of a resistance exercises on acute training effect.

Repetition duration is the sum of the concentric, eccentric and isometric phases of the movement, determining the actual duration of the effort (Schoenfeld et al., 2015). The duration of the repetition is expressed by the duration of time under tension (TUT). TUT may vary depending the number of repetitions and repetition duration, which may significant influence on exercise volume (Bird et al., 2005; Gumcio et al., 2015; Wilk et al., 2018a, 2018b). The change in repetition duration can be controlled in a conscious, planned manner, resulting in a modification of the duration of the series and the exercise (Sakamoto and Sinclair, 2006; Wilk et al., 2018b). Furthermore, the change in repetition duration in resistance training may affect the value of the generated power output, maximum strength or post-exercise metabolic and hormonal response. In the presented series of works, the main research problem is to evaluate the influence and use of different values of training adaptation. The aim of the presented series of four works is to analyze the following issues:

1 – a comparison of different lengths of controlled repetition duration in the barbell bench press on exercise volume assessed by TUT values and number of repetitions between beginners and advanced individuals,

2 - analyse and evaluate the effect of varying the duration of the eccentric phase of the movement using different grip widths of the bar in the lying bar press on the level of muscle power and bar velocity in the concentric phase,

3 - analysis and evaluation of the effect of the duration of the eccentric phase of the movement on the result of the maximum strength test during the bench press exercise,

4 - analysis and evaluation of the effect of repetition duration on the level of post-exercise endocrine responses.

In the presented series of papers, the effects of varying repetition duration on the values of exercise volume, maximal muscle force, generated muscle power and post-exercise hormonal and metabolic responses were analysed and evaluated.

The results showed that the variation of repetition duration determined by the TUT value showed a significant effect on the total number of repetitions in the series and in the whole exercise, the level of power output and bar velocity, as well as on the level of metabolic and hormonal responses. The presented series of studies showed that in the assessment of exercise volume, the duration of time under tension should be determined in addition to the commonly

used number of repetitions performed. The research showed that a longer duration of the eccentric phase of a movement results in a lower value of maximum strength and the level of power output in the concentric phase. In addition, a longer duration of the eccentric phase slightly influences post-exercise changes in GH and IGF-1 values, in contrast to a short eccentric phase (6/0/2/0 vs. 2/0/2/0). The analysis and results of this study indicate that repetition duration is an important component in terms of the resistance training process affecting the value of exercise volume, levels of maximal strength and power output and post-exercise endocrine values. Furthermore, the TUT value appears to be a more accurate indicator of the total work performed during a training unit, compared to commonly used methods. Furthermore, the effect of variable repetition rate on immediate and long-term adaptive changes may be dependent on the experience of using variable repetition tempo, which is a landmark finding of the study series.